THE ENGINEERING AND MINING JOURNAL.

RICHARD P. ROTHWELL, C. E., M. E. } Editors.
ROSSITER W. RAYMOND, Ph. D. }

NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

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AMERICAN INSTITUTE OF MINING ENGINEERS.

OFFICIAL BULLETIN.

MEMBERS and Associates, elected at the October meeting of the Institute, in Philadelphia, are hereby informed that prompt acceptance of election, accompanied by the payment of annual dues, is desired. Notification of election, with blank form of acceptance, was mailed, to all elected at this meeting, on November 1st. In case of acceptance not being received by the Secretary by November 30th, the sending of the ENGINEERING AND MINING JOURNAL will cease.

LAFAYETTE COLLEGE, EASTON, Pa. THOMAS M. DROWN, Secretary.

CORRECTION.

IN the discussion on Dr. WEDDING'S paper on the Nomenclature of Iron, the remarks commencing with the 14th line from top of 2d column, page 310, should be credited to Professor EGLESTON, and not to Mr. F. FIRMSTONE. The error was made in the report.

THE INSTITUTE COLLECTIONS.

WE learn from Philadelphia that the Museum Committee of the Institute of Mining Engineers has received already, in response to its circulars, a considerable amount of subscriptions, though by no means as much as will be necessary to transfer and arrange in Memorial Hall the numerous and extensive collections offered to the Institute. Meanwhile the stream of such gifts increases daily; and it is estimated that the aggregate value of the collections, in possession of which the Institute will find itself, is not less than $100,000. The incessant labors of Mr. ALEXANDER have not permitted the preparation of a careful catalogue; and indeed this would be out of date as soon as published, so rapidly does the list increase. But some notion of the magnitude of this movement may be inferred from a partial enumeration, which we have compiled from various letters and communications, and which, though neither official nor complete, may be considered trustworthy as far as it goes

Among the exhibits in whole or in part presented to the Institute are the superb German and Swedish collections already reported (including the great geological map of Sweden, with its illustrative cabinet, the unrivaled array of Fagusta steel, the Borsig collection, the rock-salt and metallurgical exhibits of Prussia, and the ores of Siegerland); the Luxembourg Mine and Saarbrücken furnace collection; full suites of rocks and ores from Austria, Spain, Portugal, Mexico, Canada, Queensland, Victoria, South Australia, as well as Wisconsin, Kentucky, and other States, including probably a fine array of gold and silver ores from Colorado; numerous exhibits from American firms and companies, such as the Philadelphia and Reading Company, the Rockhill Coal and Iron Company, the Kittaning Coal Company, the Hanging Rock Region, the Lehigh Valley Iron Works (collective exhibit), COOPER, HEWITT & Co., American Steel Works, almost without exception, etc., etc.—in this direction there is no limit, except such as the discretion of the Committee in accepting offers may impose. In the way of models, it is good news to hear that the beautiful and complete models of the Siemens furnace, the Pernot puddling and steel furnaces, the Lucy blast furnace, the Drifton coal-breaker, and others scarcely less costly and valuable, are included among the treasures of the Institute.

The latest reported acquisition is from Russia, and considering the special interest attached to the development of that immense field, and the comparative scarcity of information concerning it, we are inclined to rate this contribution highest of all. It comprises:

1. A massive specimen of anthracite from the mines of the Russian Navigation and Trade Company, in the Province of Don.

2. Gun rings and specimens of wrought iron and steel, from the Perm gun foundry.

3. Samples illustrating the processes of copper-smelting, from BASIL PASHKOFF'S copper works.

4. A large and varied collection of ores, coals, test-specimens, refractory materials, etc., illustrating Russian mining and metallurgy.

We think that no technical society in the world was ever so suddenly endowed with such a treasure of scientific and professional material; and when it is considered that this costs nothing but the expense of receiving it, and that, by the generous offer of the Pennsylvania Museum, these immense collections will be handsomely housed for as long a period as the Institute may desire, and under circumstances most favorable to their professional examination, as well as their public exhibition, the measure of good fortune certainly seems to overflow.

We have heard but one suggestion of a fear tending to mar the universal satisfaction of members on this subject, namely, that the Institute is in danger of being anchored to one locality by the weight of its own possessions, and that this new departure may result in the establishment of a permanent headquarters—a measure which the majority of the members, convinced that the opposite policy has been the source of extraordinary prosperity hitherto, would deeply deprecate. We also entertain that opinion, but we do not share that apprehension. We hold that the widely scattered members of the Institute, who look to its publications as the chief return for their contributions to its funds, have a right to demand that the money so accumulated shall be spent in carrying out the declared purpose of the society, namely, the reading, discussion, and circulation of professional papers. We believe also in the policy of spending all the income in this way. If there is more money than is needed—and, so far, we hear of no embarassment on that score—then we think the fees should be reduced. The establishment of permanent rooms, with the attendant cost of their maintenance, out of the fees of members, most of whom could not share the benefits of such facilities, would not, we think, be just or wise. But whatever view be taken of this question, it is not involved in the present situation. Gentlemen may subscribe freely to the funds of the Museum Committee, without fear that they are aiding a dangerous tendency or a deep intrigue.

The great advantage to this country, and to mining engineers and metallurgists in every part of it, of the preservation in one place, under the guardianship of the Institute, of the great representative collections referred to, is a subject worthy of separate discussion. We shall recur to it hereafter. *

THE END OF THE PRESIDENT'S TERM.

IT was in 1872 that the President began; and it was in 1876 that the performance came, at least temporarily, to an end; the President's operations being submerged by a rising "tidal wave," so to speak. We do not refer to President GRANT, as a little reflection will convince the reader. He began earlier, and has not yet finished, which at this present moment of writing (whatever may be the case by the time these words shall have been printed) the rise of that "tidal wave" is a matter of doubt and microscopic watching. Indeed, there is a small but resonant newsboy under our window at this witching midnight hour, announcing that the tidal wave is entirely played out on the coast of Florida—but that remains to be seen. In the meantime, the President to which we refer is the big engine over which our genial friend, Mr. B. C. WEBSTER, President of the Lehigh Zinc Company, broke a bottle of wine on the 19th of January, 1872, christening it as aforesaid, at that early period of its infant career when its walking-beam first began to walk, and before it had any jacket—the monster baby's clothes consisting, so far as we can infer, from the records of the ceremony, of pumps, tied on with wire rope, 127 feet below the collar. The same records bear witness that the youngster went to work at once, sucking and throwing up and discharging, and making no noise withal—a model for all American engineers, whether domestic or mechanical. And now, after nearly four years of active and laborious life, the President has come to a great pause. WEST, who built it, and WEBSTER, who baptized it, have combined to stop it. On Saturday, October 28, it ejected its last gallon per minute, kicked its last foot-pound, gasped for the last time through its henceforth unnecessary throttle, and solemnly gave up the vacuum. A friend who was present writes us:

"Were you at the festive start? The stop was every way in contrast—properly so. WEST (happening along by chance) arrived in Bethlehem at noon, and went over to the mines at Friedensville with WEBSTER. The foreman came up, after inspection, and reported the plungers newly packed, and everything below in perfect order. Every one was quiet and depressed; gloom hung over all. A slight spasm and expiring sigh: then silence and desolation! Darkness and cold drizzle were falling outside; and as we at last opened the door to depart, we found that a skunk had just expressed his opinion outside of what we had been doing within! By Tuesday morning the water had risen 100 feet, and about 2 feet every day since. It must have reached a level where it could begin its travels; and doubtless the ancient wells at Limeport, seven miles off, will soon rejoice as in days of old."

The history and description of the President are no doubt known to our readers; but even the best known characters are entitled to a *résumé* by way of obituary; and although we cannot fairly consider our subject as dead, since it may start into life again at any time at the word of WEBSTER, we may make the necessary assumption for the purpose of eulogy.

It was in 1847 that Prof. WILLIAM T. ROEPPER, of Bethlehem, discovered calamine at Friedensville in the Saucon Valley. In 1853 Mr. SAMUEL WETHERILL erected works at Bethlehem for making zinc-oxide. In 1859 Mr. JOSEPH WHARTON erected spelter works at the same place. In 1865 the Lehigh Zinc Company erected the first rolling-mill for sheet-zinc in America. These three branches of manufacture have continued until the present time, being chiefly

supplied from the mines in the Saucon Valley. These mines, containing massive deposits of zinc ore in limestone, have been from the beginning greatly troubled with water. The history of the company presents a series of increasing expenditures, and the introduction of one machine after another, each more powerful than its predecessor. At first there was a small pump worked by a single horse-power; then a donkey-pump (now used in dressing ores); then a 30 horse-power Burdon engine; then, in 1863, a 100 horse-power Corliss engine, raising with a series of centrifugal pumps 1,500 gallons per minute from the depth of 65 feet; then, in 1865, an engine of 32-inch cylinder and 9-feet stroke, working ultimately three 22-inch lifting pumps, and raising 5,600 gallons per minute from the depth of 122 feet; and in the same year (at the Hartman Mine) a Bull engine, of 50-inch cylinder and 10-feet stroke, throwing 1,100 gallons per minute from 144 feet depth, and a 20-horse engine at the neighboring Correll Mine. The total capacity of all the engines running in 1871 was 8,000 gallons per minute. Their cost had severely taxed the company, and enhanced the price of what would otherwise have been a cheaply extracted ore. They were barely able to keep the enormous volume of water, flowing like a river in the mines, down to a certain level. They drained the wells of the valley; but the deeper channels in the limestone were too much for them; and the company had to decide, whether it should abandon the ore-body of its principal mine, the Ueberroth, and those of all the mines when the same water-stratum should be reached in all, or take mersures for a permanently adequate machine, so as to be able to follow these rich and pure deposits to greater depths. Hence the President, with its 110¼-inch cylinder, its 10-foot stroke, its two 75-ton fly-wheels, and its capacity of 17,000 gallons raised per minute from the depth of 300 feet—the most powerful stationary engine in the world.

When the President started, the great shaft (30½ by 21½ feet) through which it drained all the mines of the company was 116 feet deep; and the work required two 30-inch plunger-pumps, set 87 feet down the shaft, and two lifting-pumps, suspended below these and working from the bottom. When it stopped, last month, the shaft was 226 feet deep, and the engine was working three 30-inch and one 22-inch plungers, with three 31½-inch and one 22-inch lifts below, the whole throwing 1,299 gallons per stroke, and the usual rate being 6½ to 7½ strokes (or, say, 9,000 gallons) per minute. The highest speed attained or required has been 13¼ strokes per minute, while setting down plungers for lower bearers.

The engine has worked with perfect regularity and steadiness from the start. There has not been the slightest interruption from any cause whatever, other than adding new pipe to the lift ng columns weekly, as the depth was increased, and the lowering of the plungers every two years. There has been a steady gain in smoothness of working, evidenced by a decrease in the consumption of lubricators.

The cause of the stoppage was the successful negotiation of a contract with the New Jersey Zinc Comyany, securing to the Lehigh Company an annual supply of 12,000 tons of ore from the great vein at Mine Hill, Franklin, Sussex Co., N. J. The contract runs for seven years, during which period no other sales of this ore are to be made in the United States, and no other zinc-oxide manufactured from it than that of the Lehigh Company is to be sold in the country. The latter company, handicapped with the cost of controlling the vast influx of water in its mines, would long ago have found it difficult to compete with its New Jersey rival, which rejoiced in the possession of a huge, dry quarry of zinc ore, but for the litigation in which the New Jersey Company has been involved, concerning some patents infringed by it in the manufacture of oxide. It is understood that these restraining patents will expire during the month; and the advantage to the the Lehigh Company—perhaps to both companies—of avoiding the ruinous competition likely to arise thereupon, is obvious.

On the completion of this contract, the further sinking of the main shaft at Friedensville was stopped, while work was pushed night and day on the ore above the water-level, the miners retreating as the water rose. The deposit was still strong and continuous in the bottom, and all the pumps and connections were left in perfect order, as they will doubtless remain for years, ready to resume work at any moment. It will be seen, therefore, that no natural obstacle, but only the business foresight and executive wisdom of President WEBSTER, has stopped the great engine. The President has simply yielded to the superior claims of another President, just as GRANT will yield to —— (that newsboy pretends to know whom; but he can't get ten cents out of us with his vociferous Delphic utterances).

The Hartman Mine of the Lehigh Company, which is at a higher level than the Ueberroth, and can be separately drained by the Bull engine, is to be worked to supply ore for the spelter works. This will maintain the high character of the company's spelter, which commands, by reason of its extraordinary purity, the highest price not only at home, but also, for special purposes, in foreign markets.

We learn upon inquiry that of the 16 Belgian spelter furnaces in the works, 11 are running and will be kept in operation, producing 8,000 pounds of spelter daily. Of 1,400 square feet of grate-surface in the oxide furnaces, 1,000 square feet will be kept running, yielding 3,000 tons of oxide per annum. The rolling mill for sheet-zinc is also running as usual. For further statements concerning the operations of this company, as well as a general review of the American zinc manufacture, the reader may consult the article *Zinc* in APPLETON'S *American Cyclopædia*. This article, being contained in the last volume of that work, which has but recently appeared, brings the history and statistics of the subject down to the end of 1875. May the APPLETONS issue many a new and revised edition, before the President of the Lehigh Zinc Company, or *his* President in the Saucon Valley, finally runs down or wears out or is broken up! *

[P.S.—Having at last bought out that newsboy, in order to make him shut up and go home, we learn that all the doubtful States are doubtful, and that several of the remote districts up Salt River are still to be heard from. We respectfully suggest that both the candidates go up there and see about it. The survivor can return.]

REYNOLDS' COMBINED HOISTING, PUMPING AND AIR COMPRESSING MACHINERY.

ILLUSTRATED IN SUPPLEMENT.

EFFICIENCY, simplicity, and durability, are the great requisites of good machinery everywhere, but for no other service are these qualifications so essential as in mining.

A large experience and full appreciation of the practical requirements of the case have led Mr. GEORGE H. REYNOLDS, the accomplished engineer, to design and the Delamater Iron Works, of New York, to build the machinery which we illustrate in the acccompanying special supplement.

This plant consists of two steam cylinders 20 inches diameter and 40 inches stroke connected at right angles on one main driving shaft, on which are four friction wheels 40 inches diameter, 8 inches face. These drive, through corresponding wheels 88 inches diameter, the four counter shafts, each of which carries a pinion working in a spur wheel on the drum. There are four parallel, grooved, cast iron drums 7½ feet diameter, 6 feet 5 inches width of face, which run on trunnions, cast upon their heads, and resting in bearings independent of the main driving shaft. The steam engines are intended to run constantly at a speed of 80 revolutions per minute, this speed being regulated by governors acting on automatic cut-off valves. Directly behind the steam cylinders are air compressors 12 inches diameter, the stroke being the same as that of the steam pistons, (40 inches.) The air compressor piston rods are connected to the prolongation of the steam piston rod in such a manner that, when desired, the compressor can be disconnected without trouble or delay.

Compressed air for driving rock drills, and for underground engines, has become a necessity at every well regulated mine, so that the compressing cylinders are an important feature in this machinery. As these compressors must make as many strokes as the steam engine, a special arrangement is provided by which, when the pressure of the air in the pipes has attained the desired degree (say 65 lb. to the square inch), one of the inlet valves is held open by the delivered air, and thus the air pistons have no work to perform beyond furnishing the amount of air necessary to maintain the given pressure.

The compressed air is cooled by water circulating between the inner and outer cylinders, and by a peculiar arrangement of surface coolers. An artificial dew point is established upon the inner surface of the cylinder sufficient to lubricate the hemp-packed piston, and no other lubrication of any kind is used.

The pumps are driven through a pinion and spur directly off the main shaft, and are of the Reynold's plunger type, 8 in. diameter, 48 in. stroke.

If one of the engines needs repairs, it can be disconnected from the main shaft, and the work be performed by the other; or if only partial work is being done in the mine, one engine can be used to perform it, thus economizing fuel and labor.

The machinery is of the very best workmanship, and there is claimed for the system cheapness in first cost, economy of fuel in operation, saving of labor in attendance, and great efficiency.

The hoisting machinery is of Mr. REYNOLDS' usual type, such as is in use in the mines near Lake Champlain, N. Y., at Iron Mountain, Mo., Lake Superior, Mich., and many other parts of the country, so that its efficiency and economy have been determined by actual use, and the fullest imformation can be obtained concerning its working.

The fact that the machinery is built by the Messrs. C. H. DELAMATER & Co., of New York, is a sufficient guarantee of the quality of the workmanship.

The rock drill built by these works is known as the Union Rock Drill; it was exhibited at the Centennial, where it attracted much attention for its simplicity and efficiency. In another column will found the description of this drill as furnished by the special correspondent of this JOURNAL, at Philadelphia.

NOTES.

THE following notes have been collated from the *Zeitschrift des Vereins Deutscher Ingenieure*, by the *American Chemist*:

OBTAINING SULPHUR FROM PYRITES.—Dr. P. W. HOFFMAN.—Sulphur dioxide from roasting pyrites is passed over hot calcium sulphide, when the following reaction takes place: $CaS + 2SO_2 = CaSO_4 + 2S$, by passing illuminating gas over the $CaSO_4$ or calcining with charcoal at red heat, CaS is regenerated, and the process may be repeated indefinitely.

POTASH INDUSTRY AT LEOPOLDSHALL AND STASSFURT.—A. LANGBEIN.—History of the development of this industry, wi h a description of the processes employed in working up the mineral into salable products. The potash industry was started in 1861, during which year there was but one factory, which produced 47,000 cwt. In 1874 there were 24 factories, which produced 8,371,000 cwt. of potash salts.

EFFECTS OF A LAYER OF INCRUSTION ON THE EVAPORATING POWER OF A STEAM BOILER.—HAGEN.—The thickness of the incrustation appears to have less effect than the nature of it. A case is cited in Cornwall, where for equal amounts of steam an incrusted boiler took 25 per cent. more fuel than a clean one, and one where the bottom was covered with soot, took 10 per cent. more fuel.

ON THE REASONS FOR THE FLOATING OF SOLID UPON MOLTEN IRON.—Discussion in the *Niederrheinischer Bezirksverein*.—The following were suggested: 1. That the motion of the molten mass was such as to keep a solid body on the surface. 2. That some gas, as CO, or air, formed a layer over the surface of the solid iron in such a way as to make it specifically lighter. 3. That the density of molten iron has not been as accurately determined as is necessary for a perfect understanding of the question.

THE COMPOSITION OF COAL.—Mr. Hiltl concludes:

1. The determination of the percentage of oxygen by elementary analysis is a valuable means of determining the relative age of a coal.

2. The classification of coals by the percentage of volatile combustible matter is of greater technical importance than the elementary analysis. To determine the volatile combustible, the application of heat should cease as soon as the evolution of combustible gases stops.

3. A regular diminution in volatible combustible constituents is observed in going through a seam of coal from hanging to foot-wall. Occasional exceptions to this occur, but it is usually well marked.

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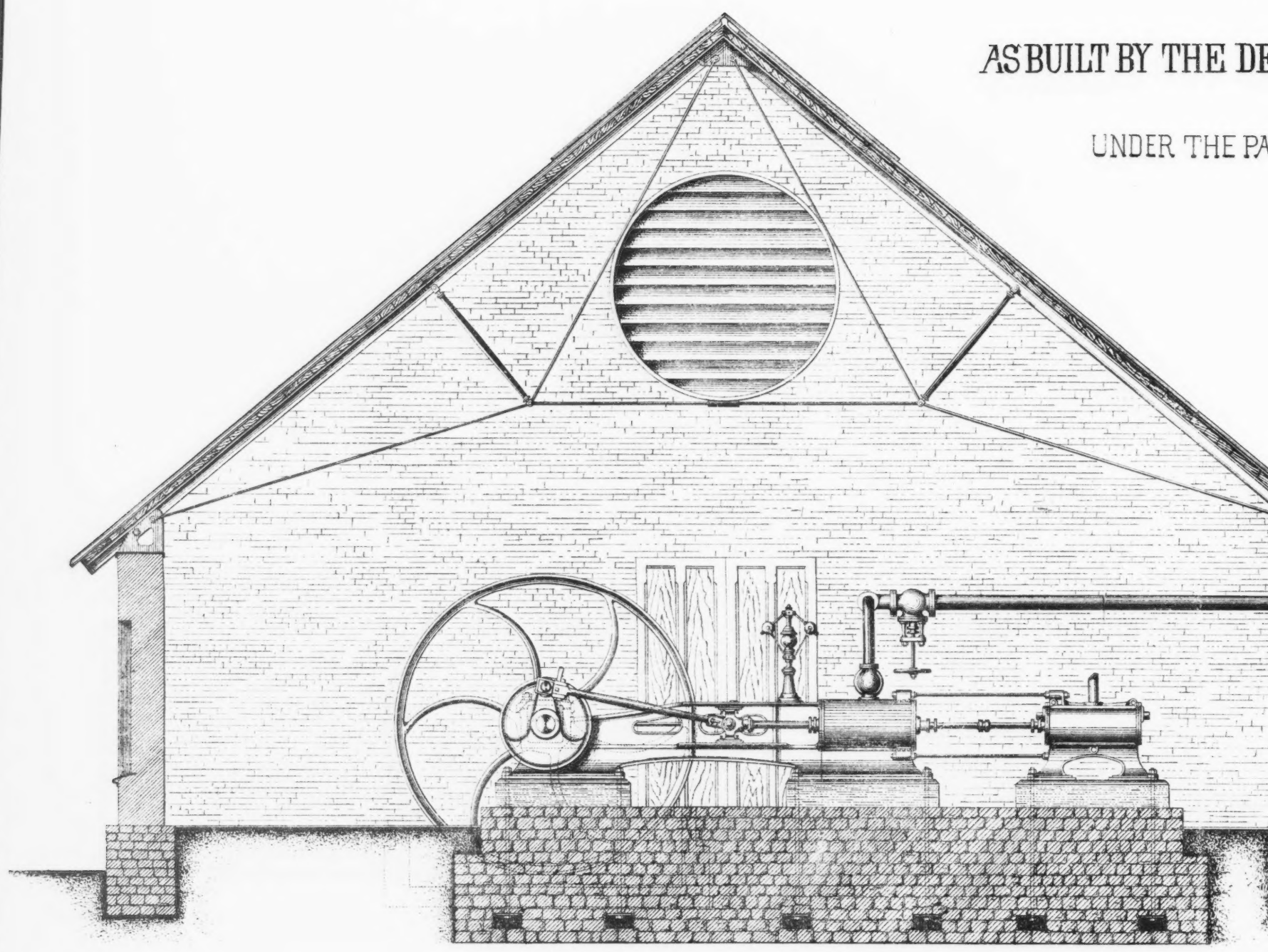

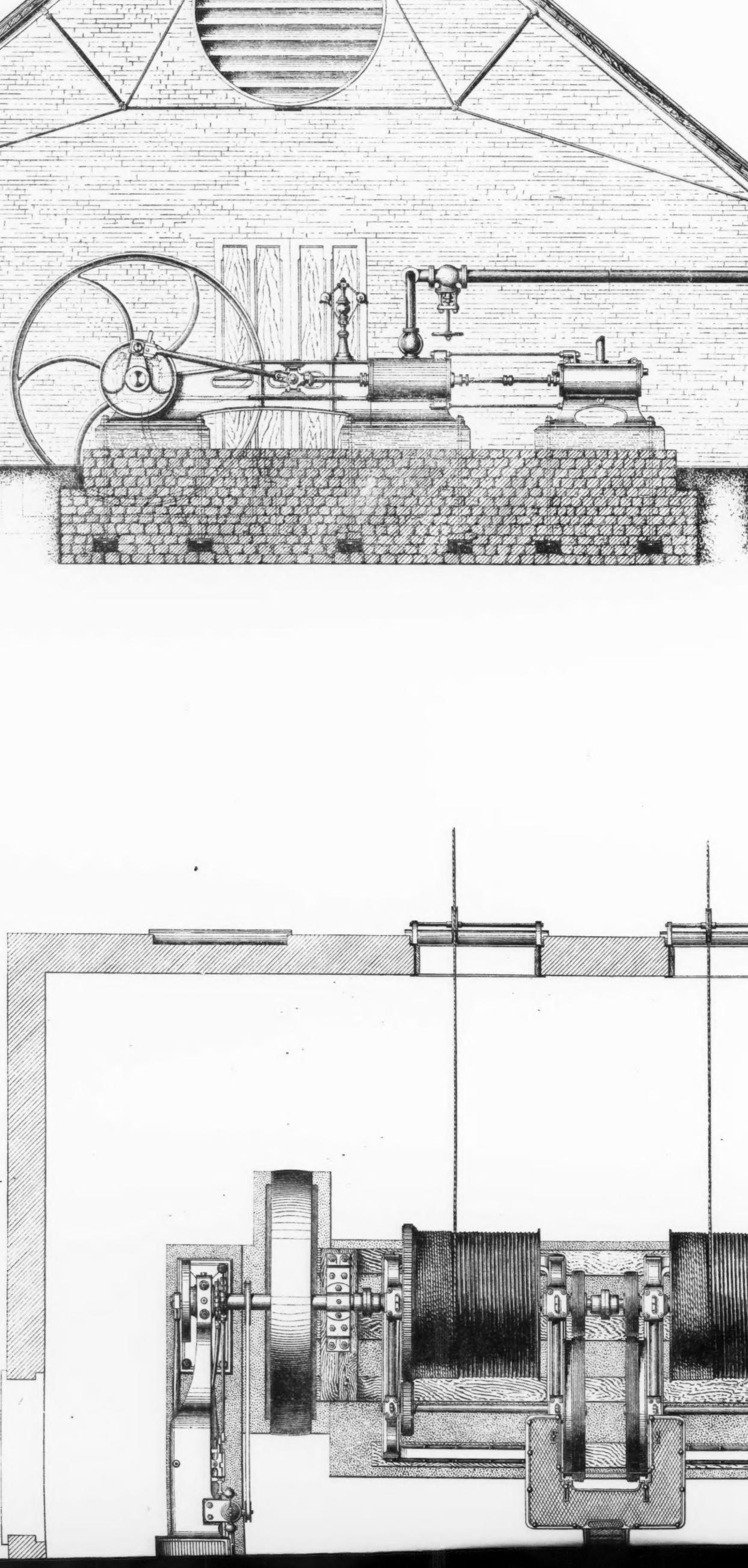

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HE DELAMATER IRON WORKS NEW YORK

THE PATENTS OF GEO. H. REYNOLDS M. E.

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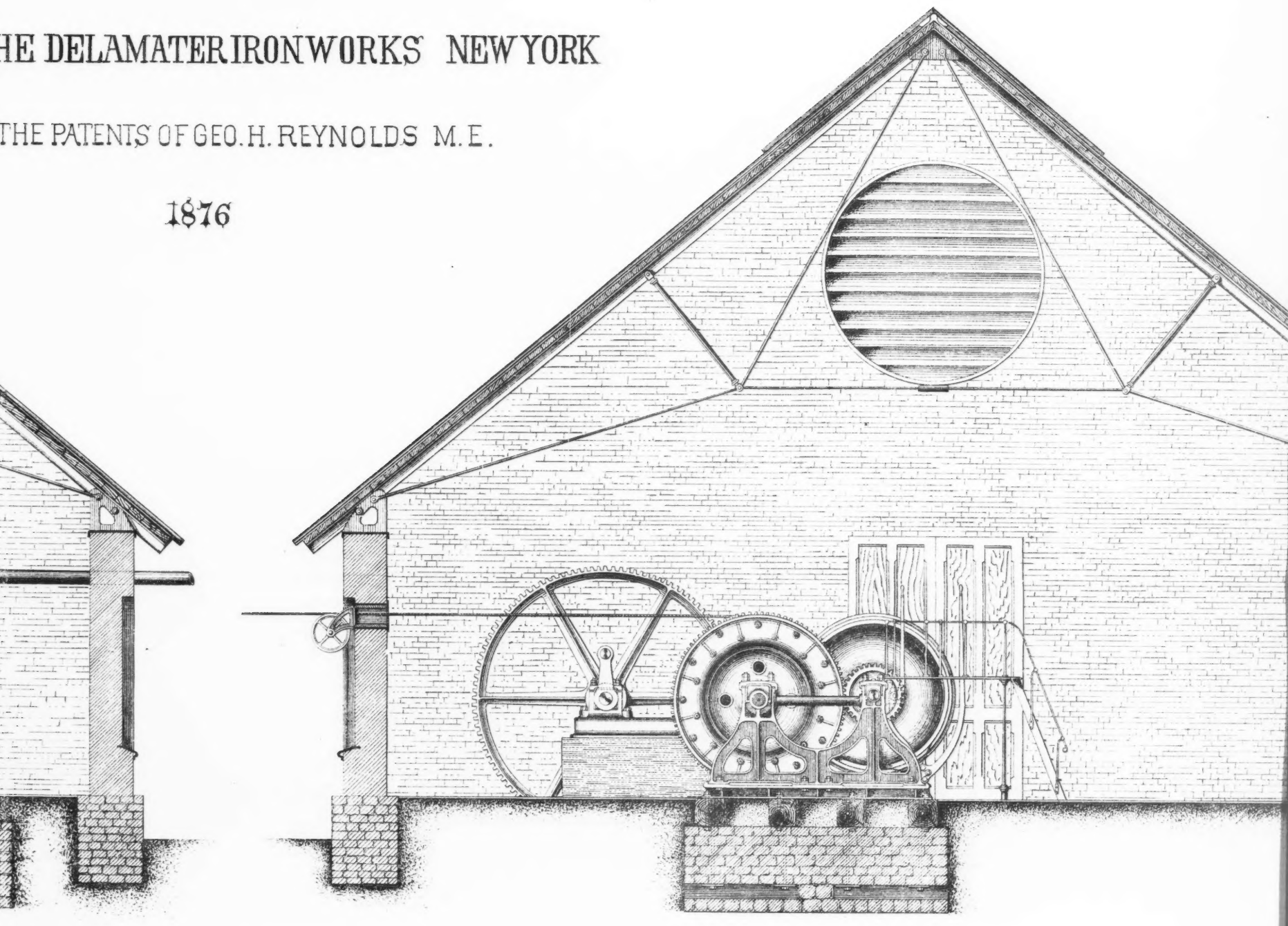

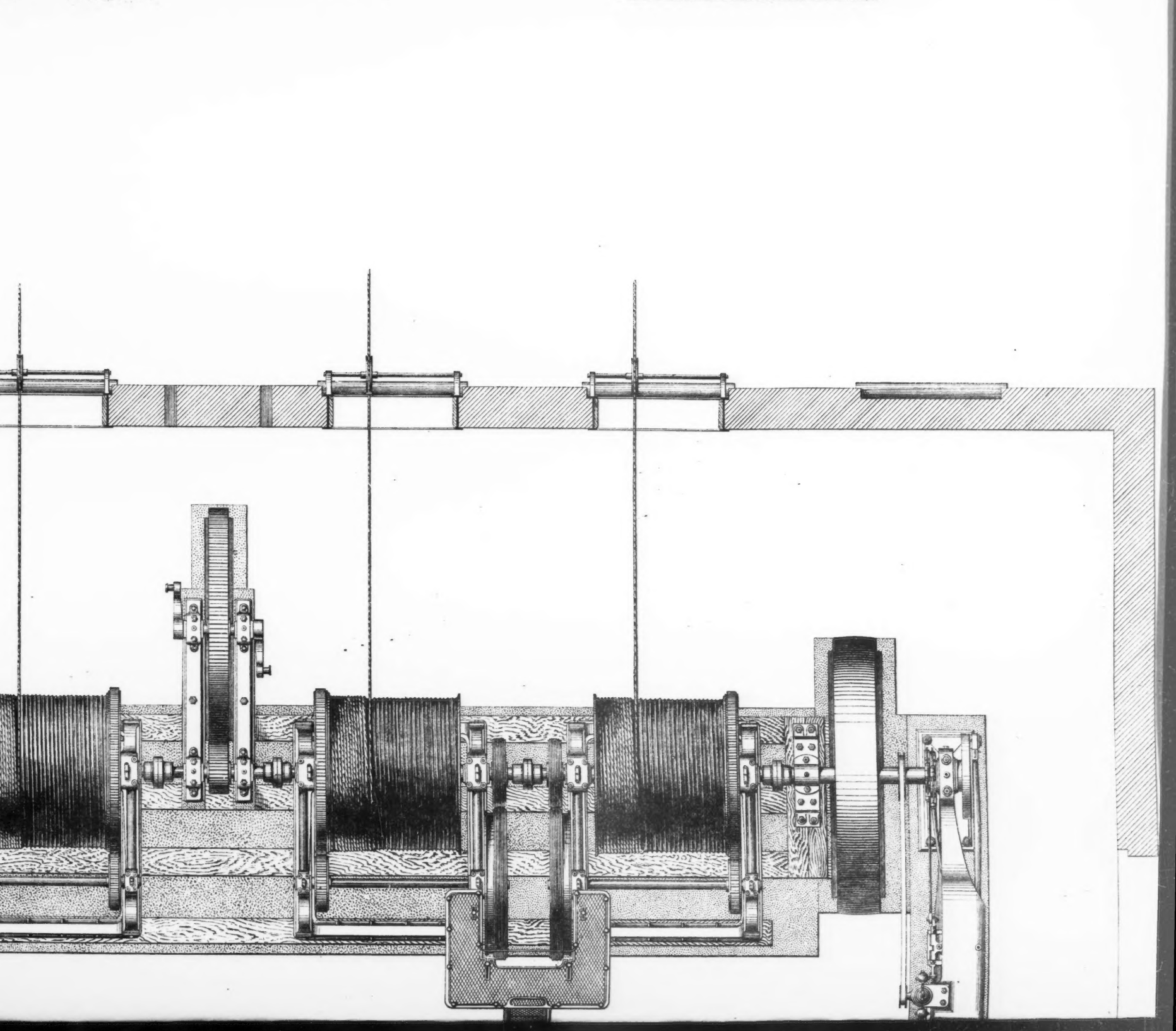

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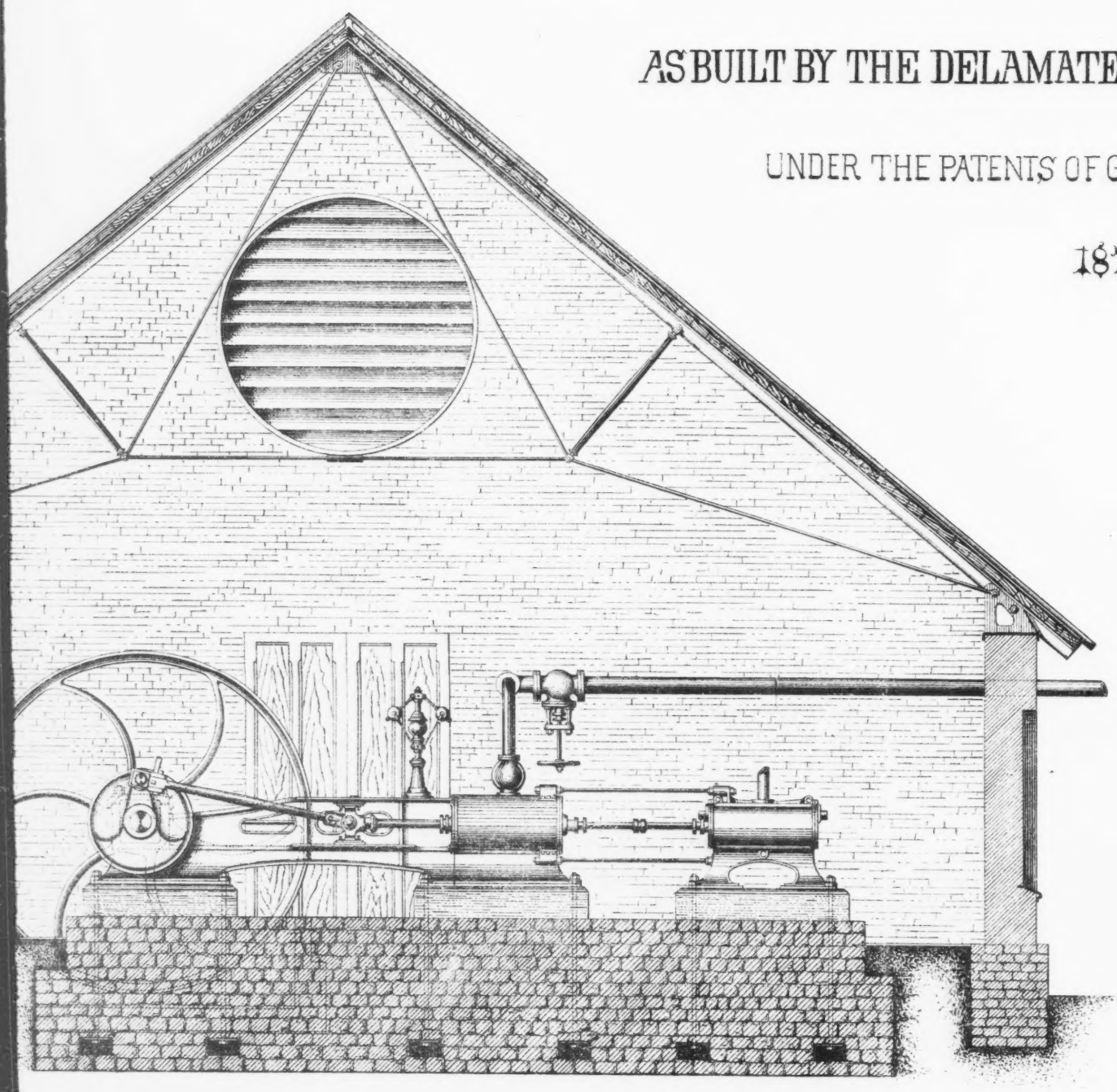

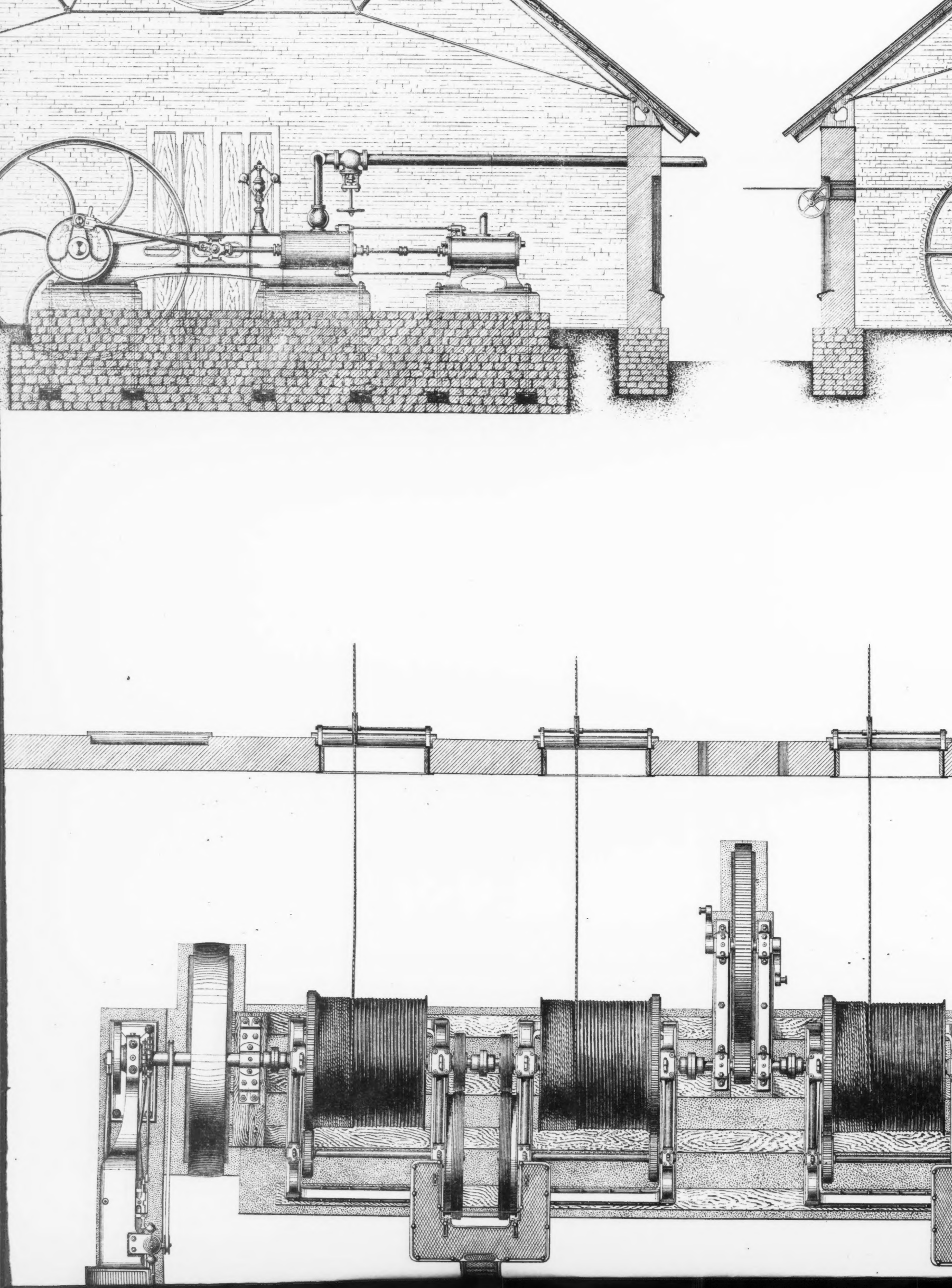

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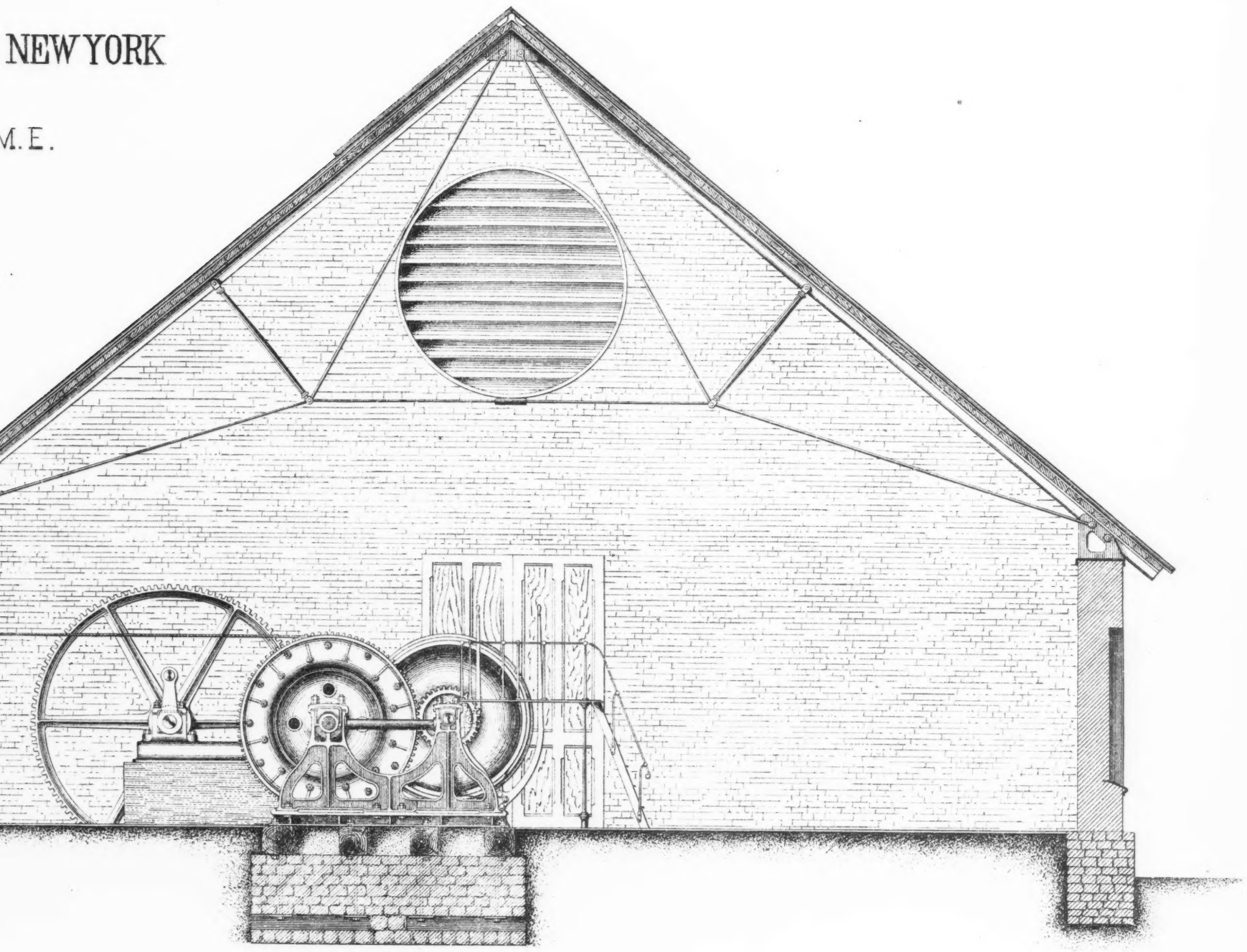

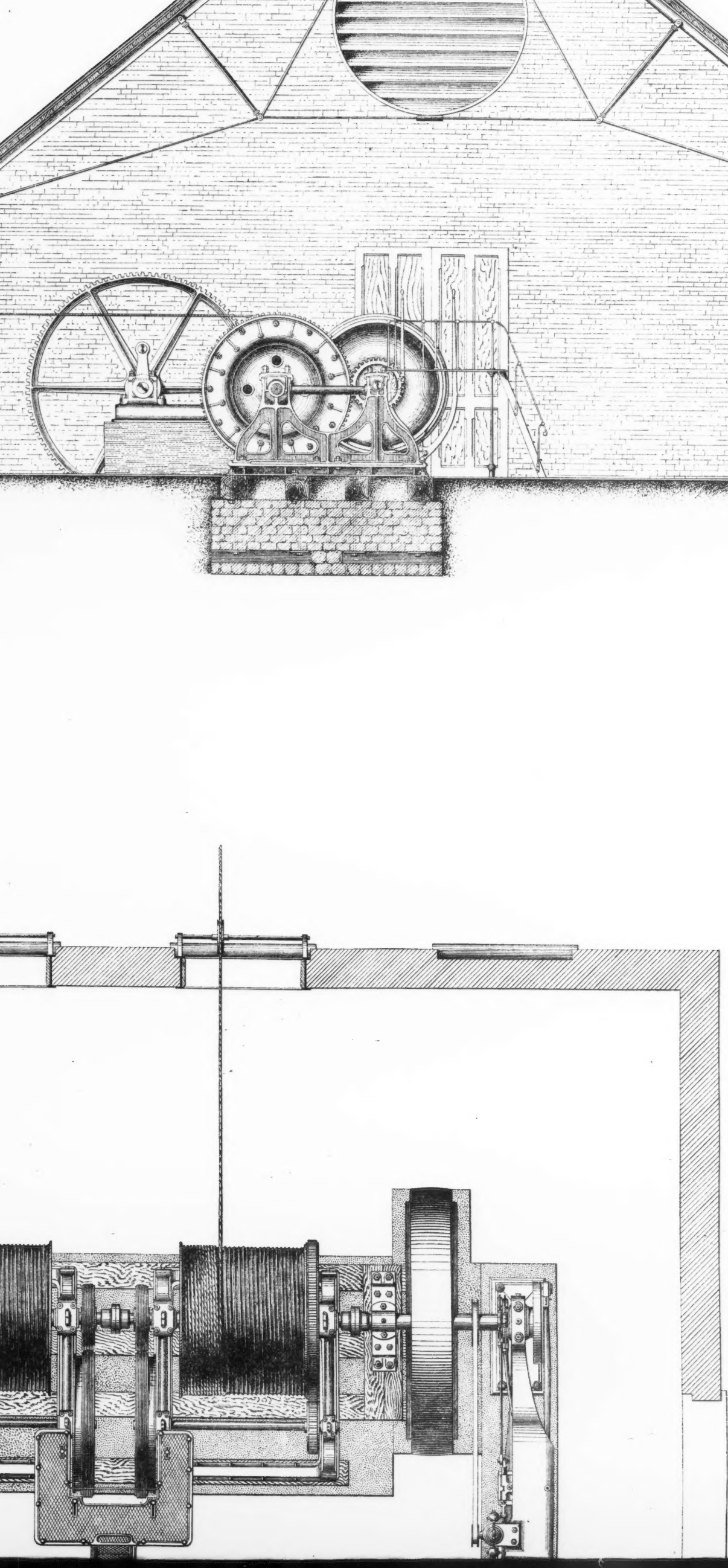

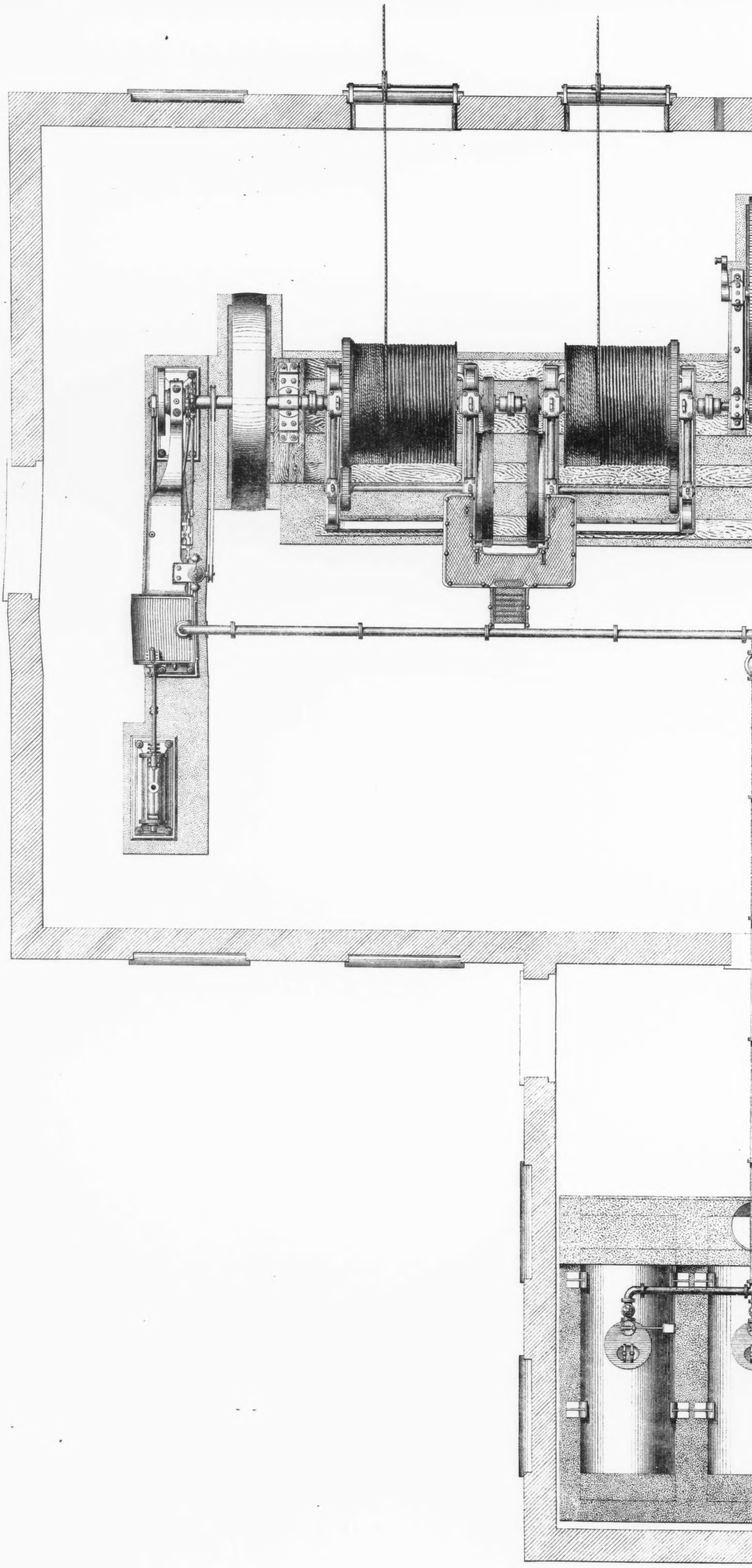

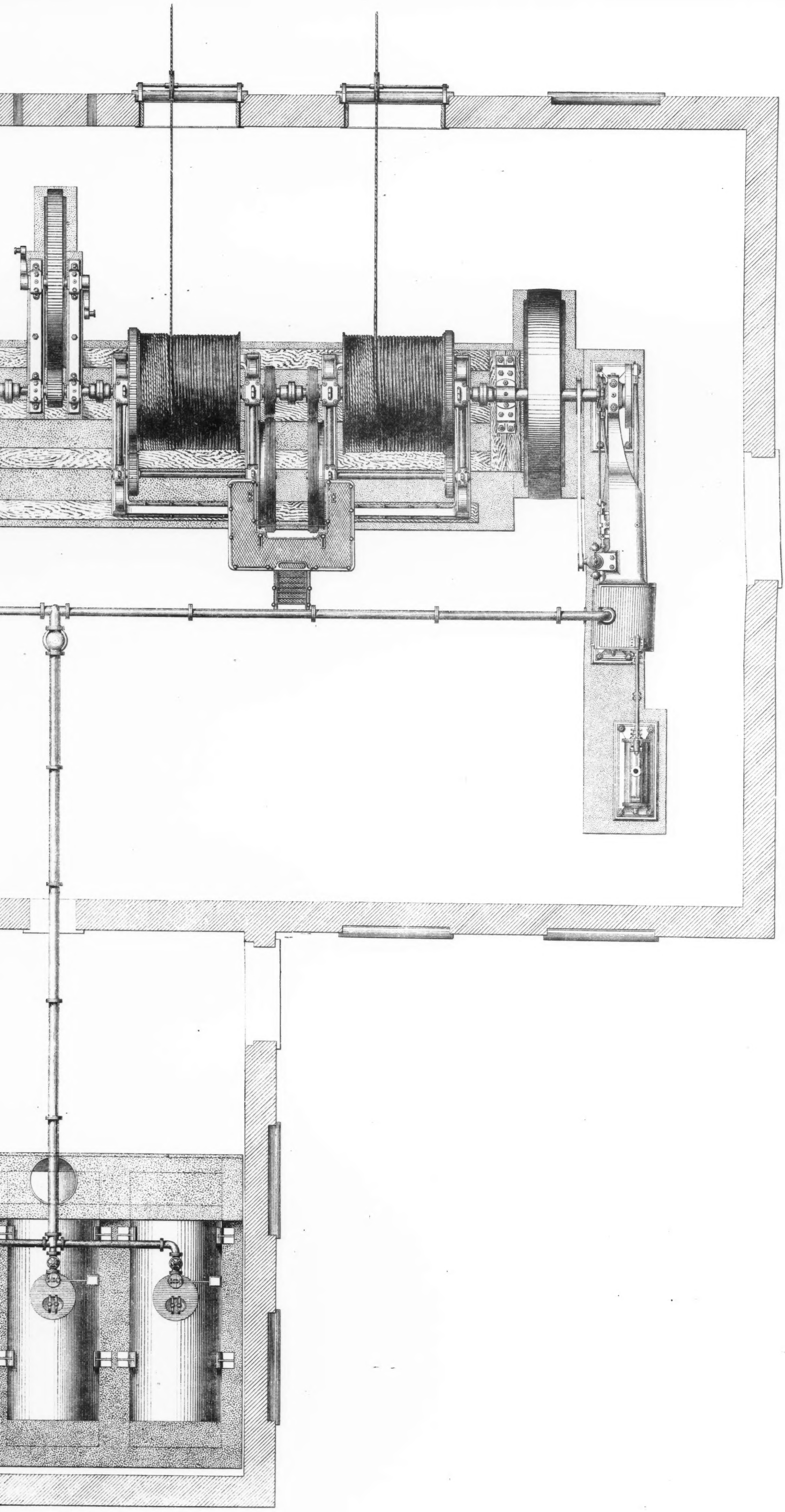

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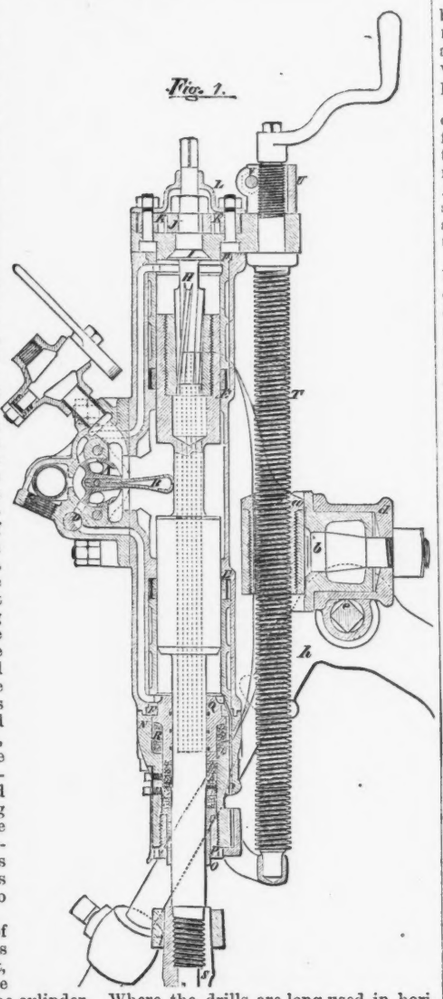
ROCK DRILLS AT THE PHILADELPHIA EXHIBITION.

Special Correspondence of the Engineering and Mining Journal.

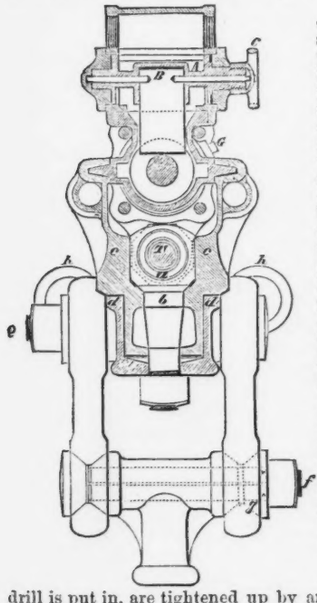
THE UNION ROCK DRILL.

ONE of the more recent, and, therefore, presumably the most perfect, of these machines, is the Union Rock Drill, made under the combined patents of REYNOLDS & WINCHESTER, and unites in itself the good points of the original machines. A number of these drills were shown in operation in Machinery Hall. Like the other drills of the same class a solid steel piston is used, which has an annular recess cut out of the middle of it. This recess is made to accommodate the end of a steel lever which operates the steam or air valve. The valve is an oscillating cylindrical one, not presenting any peculiarities of construction, except in having an auxiliary valve in the part which leads to the lower side of the cylinder, so that no matter what be the weight of the drill or the position in which it is drilling, a uniformly effective stroke on the rock can be kept up without endangering the upper head of the drill. This simple device seems to be a very good one. The rotation of the drill is effected by means of a twisted four-armed bar, which turns freely, in one direction, in the upper head of the cylinder, a ratchet wheel and double pawl preventing an opposite motion. The other end of the bar, carrying the four radial arms passes through a brass grooved nut screwed into the end of the piston.

Fig. 1.



The piston, instead of containing packing rings to make it steam tight, slides in rings which are held in recesses cut in the cylinder. Where the drills are long used in horizontal position, this form of construction must prove advantageous, as the revolution of the piston, instead of wearing the cylinder out of true, only wears upon the two packing ring bearings which can easily be replaced.



The striking of the drills against either cylinder-head is prevented by steel rings, which are backed by elastic packings, one of which is inside the cylinder at its lower end. A steel bushing ring fits inside the gland in the outside stuffing-box, and rests against the elastic packing. Should the piston be forced upward too strongly, the chuck which holds the drill strikes this ring, and prevents the piston from damaging the upper cylinder head. Four long bolts, which pass through from one head to the other, strengthen these parts of the machine. The feeding apparatus consists of a heavy screw, which is held at both ends in projections from the cylinder heads, the screw working in a long nut which is screwed into the iron axis of the cage on which the whole drill turns. The tripod used in quarry work has adjustable legs, the solid upper portions of which slide in hollow-pointed ends, an arrangement which attains an easy adjustment of position without necessitating the removal of the weights which hold the machine down to its work. The chuck, in which the drill is held, consists of a tapering piece of steel, which is split from end to end, and held down on a screw thread cut in the piston rod by a steel ring.

The drill end of the same piece has two more slits in it, which, when the drill is put in, are tightened up by another ring. The steel band is beveled outward from the cylinder, so that the impact of blows only tends to tighten the rings.

These drills are manufactured by the Messrs. C. H. DELAMATER & Co., of New York.

A HISTORY OF THE BESSEMER MANUFACTURE IN AMERICA.*

By R. W. Hunt, Troy, N. Y.

(*Concluded from page* 316.)

THE Cambria Iron Company, of Johnstown, Pa., were the sixth parties to build Bessemer Works, their first blow being made by the writer on July 10th, 1871. As stated, the Cambria Iron Company did not erect Bessemer Works until after five other concerns had started theirs, but nevertheless they were the very first corporation to give encouragement to attempts to perfect the new process.

When Mr. KELLEY turned his attention to endeavors to shorten the process of refining iron by blasts of air, he was part proprietor and manager of a blast furnace at Eddysville, Kentucky. As in the case of many another seeker after the unknown, he spent all of his own money, and, moreover, seriously embarrassed himself financially. It was about this time that BESSEMER obtained his American patents. After filing his claims as the original discoverer, Mr. KELLEY succeeded in interesting the Cambria Iron Company, and under their patronage he transferred his experiments to their works at Johnstown, in 1859, and there met with the usual number of encouraging failures.

The first Bessemer converter ever erected in America, was built at Cambria, by Mr. KELLEY, and still remains there, a cherished relic. It was calculated to convert about half a ton of metal, and received its blast from the foundry blowing engine of the works. But I never heard even a tradition of a perfect conversion made in this vessel. Still the Cambria Company, and more particularly its general manager, the Hon. DANIEL J. MORRELL, were impressed with the possibility of success, and when the KELLEY Process Association was organized, they were among the most earnest members. But the conservatism of some members of the company prevailed, and they did not complete their Bessemer Works until 1871. Their Chief Engineer, GEORGE FRITZ, had been personally familiar with all of Mr. KELLEY's experiments, and had closely watched the progress of the process as developed by BESSEMER and others, and during the time the steel made at the Pennsylvania Steel Works was rolled at Cambria, he had abundant opportunities of studying the manufacture in its various mechanical details, and fully realized the advantages embraced in the innovations introduced in the arrangement and details of Bessemer plants, by Mr. A. L. HOLLEY. They had been thrown, during this time, into the closest personal intercourse, and while Mr. FRITZ was only too happy to assist Mr. HOLLEY with his advice and large experience in the perfecting of the plans of the rail mill for the Pennsylvania Works, he was equally willing to avail himself of the latter's experience and advice in arranging his plans for the Cambria Bessemer plant.

But GEORGE FRITZ could not blindly copy, and while cheerfully acknowledging everything taken from Mr. HOLLEY, he introduced many new ideas in his arrangement of plant. He built vertical, disconnected blowing engines, and arranged his converting building under one roof, without any dividing wall between the melting and casting house. And when he came to the blooming mill he introduced the entirely new features of driven rollers in the tables to the rolls, and a hydraulic pusher for turning over and moving the ingots on the tables. These two features constitute the FRITZ Blooming Mill Patent, now used by most of the Bessemer Works of this country. The merits of rolling as opposed to hammering had been fully discussed between Mr. FRITZ and Mr. HOLLEY, and they had, at various times, gone over the numerous details of a blooming mill, and Mr. HOLLEY, as already stated, had built one at the Troy Works. Mr. FRITZ had availed himself of the benefit of the extensive knowledge and sound judgment of his brother, Mr. JOHN FRITZ, of Bethlehem, Pa., and the result of all was the Johnstown Blooming Mill, which marked a new era in the Bessemer manufacture, and, while living to see many difficulties overcome, and great progress made, he died too soon, his country losing one of her noblest and ablest sons. He died August 5th, 1873.

The writer remained in charge of the works until September, 1873, when he went to Troy and was succeeded by Mr. JOHN E. FRY, who is still in charge. The greatest yield at these works has been as follows: March 21st, 1876, 297 gross tons in 24 hours; week ending May 20, 1876, 1,475 gross tons; month ending March, 1876, 6,051 gross tons.

The seventh works to go into operation were owned by the same parties who controlled the Cleveland Works, and were located at Bridgeport, or South Chicago, Ill. Their first blow was made on July 26, 1871, and the works have been in almost constant operation ever since. They contain two five ton vessels, and the general arrangement is similar to the Newburg Plant.

The North Chicago Rolling Mill Company, of Chicago, Ill., built and started the eighth Bessemer works. Captain E. B. WARD, of Detroit, was one of the heaviest owners in this company, and he, as before stated, had owned the Wyandotte Works, and was fully convinced of the merits of the process, and while abandoning the last named establishment, took steps to have a larger and more complete plant erected in Chicago in connection with the extensive iron works of the company. Mr. A. L. HOLLEY was engaged to furnish the plans, and the works were erected under the direction of Mr. O. W. POTTER, then the General Superintendent of the Company. Mr. HOLLEY, profiting by the experience acquired in building the several other works with which he had been connected, and by the already advanced state of the art, introduced many improvements in the arrangement of this plant, and when completed it was undoubtedly the most perfect in existence. The first blow was made on April 10, 1872, under the direction of Mr. ROBERT FORSYTH, who had received his Bessemer education at the Troy Works. This gentleman has ever since remained in charge of the converting works, and has been most eminently successful in his management. His works are to-day producing the largest product of any in the world. The plant contains two five ton vessels. I might here say that while all the present American plants are said to consist of two five ton converters—the general practice is to convert nearer six tons in them. The ingots are bloomed in a three high 30 inch mill with the Fritz tables.

The records of the North Chicago Company show their largest product for twenty-four hours to have been 330¼ gross tons; for one week 1,583 gross tons; and for one month 6,457 gross tons.

The Joliet Iron and Steel Company, having rolling mills at Joliet, Ill., and blast furnaces at Chicago, determined to erect the ninth Bessemer plant in connection with their Joliet works. They purchased of the Freedom Steel Company their blowing engine, converters, hydraulic cranes, etc. Mr. HOLLEY was engaged to furnish the plans, and the works were built under his general direction. Mr. A. L. ROTHMAN and Mr. P. BARNES being the engineers in direct charge. The converting plant consists of two five ton vessels, and the blooming train is similar to that of North Chicago. The general arrangement of the two converting works is also very similar. The first blow was made on March 13th, 1873, under the direction of Mr. DUNNING, who still remains in charge of

* A paper read before the American Institute of Mining Engineers, at the Philadelphia meeting, June, 1876.

the works. Their records show the greatest product in 24 hours to have been 350 gross tons. In one week 1,528 gross tons, and 5,367 gross tons for one month.

The tenth Bessemer plant was built by Mr. JOHN FRITZ for the Bethlehem Iron Company, of Bethlehem, Pa., and of which he was, and is, General Superintendent and Chief Engineer. Mr. HOLLEY being connected with him as consulting Engineer. Mr. FRITZ had studied the various American plants, and also visited England and the Continent, and after mature deliberation concluded to take a new departure. He arranged his smelting house, engine room, converting room, blooming and rail mills, all in one grand building, under one roof, and without any partition walls. He placed his cupolas on the ground and hoisted the melted iron on a hydraulic lift, and then poured it into the converters. The spiegel is melted in a Siemen's furnace, also on the ground floor, and the melted spiegel also hoisted and poured into the vessels.

The blooming train has the middle roll stationary, the same as the Cambria mill, and the top and bottom rolls screwing up and down. Instead of depending upon friction to drive the rollers of the tables, he put in a pair of small reversing engines. This feature has been adopted in a method which dispenses with belts, by means of a direct connection of the engines with the lathe, as arranged by Mr. HOLLEY, in several of the other works. The works made their first blow on October 4, 1873, under the charge of Mr. OWEN LEIBERT, who is still the superintendent. The highest product has been 264 gross tons in 24 hours; 1,340 gross tons in a week, and 5,282 gross tons in one month.

The Edgar Thomson Steel Company, limited, of Pittsburgh, Pa., were the eleventh parties to enter the business, locating their works at McKelvey's Station, on the Pennsylvania railroad, about nine miles from Pittsburgh. Mr. HOLLEY furnishing the plans and Mr. P. BARNES being the resident engineer, the latter getleman having severed his connection with the Joliet Works. In the Fall of 1873, Mr. WM. R. JONES, who had been GEORGE FRITZ's assistant at Cambria, became connected with the Edgar Thomson Company, and upon the starting of the works in August, 1875, assumed charge of them. He is now the general superintendent of the company. Their largest product for twenty-four hours has been 265 gross tons; largest for a month's work, 5,403 gross tons.

In arranging these works, Mr. HOLLEY made many improvements over any of his previous efforts, and assisted as he was, the works stand to-day as a fit monument of the progress of the Bessemer Process in this country.

The twelfth and last works to start were those of the Lackawanna Iron and Coal Company of Scranton, Pa., being added to their already large iron plant. The converting works were built by Mr. A. L. ROTHMAN, Mr. HOLLEY acting as consulting engineer. The former gentleman started the works on October 23, 1875, and remained in charge until May, 1876, when he was succeeded by Mr. GEORGE F. WILLOUR, who obtained his Bessemer experience at Johnstown, Pa. The Blooming mill was built from Mr. HOLLEY's plans, under the supervision of Mr. W. W. SCRANTON, the general superintendent of the company, and has all the late improvements.

The Vulcan Iron Company, of St. Louis, Mo., have their converting works and Blooming mill nearly ready to start, they being put up as an addition to their already large iron rail mill and extensive blast furnaces. Mr. HOLLEY has furnished the plans and Mr. D. E. GARRISON, the general manager of the company has had immediate charge of the erection. When these works start there will be in operation eleven five ton plants with 22 vessels, capable of turning out, in the aggregate, 550,000 gross tons of ingots per year.

Having enumerated the various Bessemer Works according to the order in which they started, and in so doing having referred to the wonderful increase in product, it seems a fitting conclusion to briefly review the causes of such wonderful strides in capacity. As stated, after building the original experimental plant at Troy, Mr. A. L. HOLLEY seems to have appreciated that the manufacture was capable of a development far beyond any which had been attained in those countries in which it was already considered a success.

Even if his mind did not fully realize this conclusion, his mechanical intuition was alive to the possibilities of improvement, and the result of his thought gave us the present accepted type of American Bessemer Plant. He did away with the English deep pit; he substituted top-supported hydraulic cranes for the more expensive counter-weighted English ones, and put three ingot cranes around the pit instead of two, and thereby obtained greater area of power. He changed the location of the vessels as related to the pit and melting house. He modified the ladle crane, and worked all the cranes and the vessels from a single point; he substituted cupolas for reverberatory furnaces, and lastly, but by no means least, introduced the intermediate or accumulating ladle which is placed on scales, and thus insures accuracy of operation by rendering possible the weighing of each charge of melted iron, before pouring it into the converter. These points cover the radical features of his innovation. After building such a plant, he began to meet the difficulties of details in manufacture—among the most serious of which was the short duration of the vessel bottoms, and the time required to cool off the vessels to a point at which it was possible for workmen to enter and make new bottoms. After many experiments the result was the Holley Vessel Bottom, which, either in its form as patented, or in a modification of it as now used in all American works, has rendered, as much as any other one thing, the possibility of the present immense production.

Then he tried many forms of cupolas. At Troy, adopting in the original plant a changeable bottom, or section below the tuyeres, and developing this idea still further in the first 5-ton works. Then later, at Harrisburg, assisting Mr. J. B. PEARSE in developing the furnace to a point which rendered these many bottoms unnecessary, chiefly by deepening the bottom and enlarging the tuyere area. Upon his rebuilding the Troy Works after their destruction by fire, he put in the perfected cupolas. At this time the practice was to run a cupola for a turn's melting, which had reached eight heats or forty tons of steel, and then dropping its bottom. This was already an increase of one hundred per cent. over Mr. HOLLEY's brag of the same amount in twenty-four hours. The Cambria Works were now running, and Mr. HOLLEY had become officially connected with them as Consulting Bessemer Engineer. Many discussions and consultations took place between GEORGE FRITZ, Mr. HOLLEY, and the writer, as to the possibility of increasing the product of the works.

Among other things, tapping cinder from the cupolas was thought of, and decided upon. These works had already placed their turn's work at nine instead of eight heats. The Pennsylvania Works, under Mr. J. B. PEARSE's management, followed with an increased production. The Cambria Works applied the cinder tap, and the production went up to the unanticipated amount of thirty heats, or one hundred and fifty tons in twenty-four hours. Grand as we thought this, it is only about one half of the present yield of each of several works. During all of this time many details were modified, and as the new ways proved successful they were adopted into the regular practice. I think one thing which had a strong bearing on the increased production was the labor organization of the Cambria Works. In compliance with the policy decided upon, I started the Converting Works without a single man who had ever seen the outside of a Bessemer Works, and, with a very few exceptions, they were not even skilled rolling-mill men, but on the contrary were selected from intelligent laborers. The result was we had willing pupils with no prejudice, and without any reminiscences of what they had done in the old country or at any other works. Of course when one works went ahead, the others had to follow. Mr. GEORGE FRITZ was the embodiment of push, and with such men to call on as WM. R. JONES, J. E. FRY, CHARLES KENNEDY, ALEXANDER HAMILTON, and D. N. JONES, his efforts were ably seconded, and Cambria for a long time maintained the lead.

Mr. Z. S. DURFEE tried at Wyandotte to fill an ingot mould from the bottom, the steel being poured into the top of an adjoining mould. Upon taking charge of the works, I still further carried out this idea, and later Mr. JOHN E. FRY and myself took out a patent on the process. At about the same time Mr. HOLLEY, at Troy, was elaborating the same idea, and later, at Harrisburg, carried it much further and patented it.

After the starting of the Cambria Works the process of bottom casting was fully gone into, and Mr. WM. R. JONES' improvements, since patented by him, rendered it a complete success. I know some makers do not fully acknowledge its merits, but it certainly has a right to rank among the prominent features of the American Bessemer practice.

While I am not able to mention all the very many good things accomplished by the gentlemen at each and all the various works, I am, at the same time, well aware they have all done their share toward achieving the great end; and, fortunately, their respective relations have been so pleasant, that each one's experiences have been freely imparted to the others. This has done wonders to advance the science. But without one element, all skill and all mechanical talent would have been wasted, and with it nearly all things have been possible. That element has been, and is—"American push."

[The discussion on this paper will follow next week.]—ED. E. & M. J.

A WIND WHEEL PUMP.

THERE are many localities where steam power is expensive and water power altogether wanting that will find great advantage in making use of the wind mill as motive power. Indeed, where the service is such as can be performed by the intermittent action of the wind this is probably the cheapest of all motors. The storing of water in reservoirs, such as at railroad watering tanks, in reservoirs at many mines, furnaces, mills, farm yards, etc., are cases in which the wind can be used with great advantage, and where the wind wheel pump, manufactured by the Hartford Pump Company, of Hartford, Conn., will be found cheap and effective.

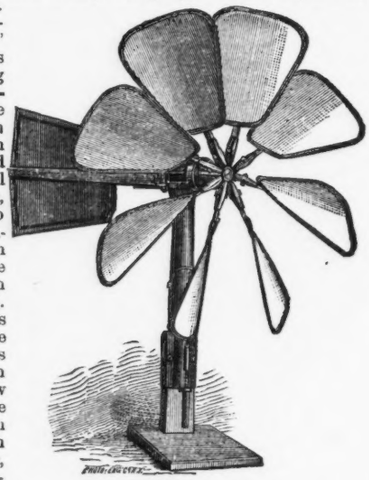


FIG. 1.

Fig. 1 of our illustration represents the "improved wind wheel" of this company. The advantages claimed for it are that the moving parts are all placed within the upright shaft which supports the wheel, and thus protected from liability to become clogged from sleet or snow. The power obtained by the revolutions of the wheel works a simple air compressor, which forces air through a pipe, to any requisite distance, to the curious automatic pump shown in Fig. 2, which is placed near the bottom of the well. The action of the pump is readily understood. The two submerged water boxes or cylinders are attached to the equal arms of a lever, which is hung on a pivot in the center in such a manner as to see-saw through a space at the end of the lever of three or four inches. Each cylinder has a valve in the bottom opening upward to admit the water, and also at the bottom, on the inner side, a discharge pipe for the water. These discharge-pipes unite in a common upright main. Attached to the

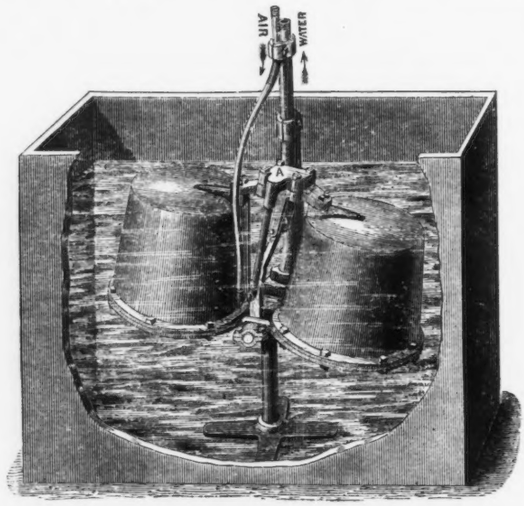


FIG. 2.

cylinders at the top, and directly between them, is the air-valve A, which deter-

mines the passage of the compressed air alternately from one cylinder to the other, and is worked by a lever at each oscillation of the buckets.

The compressed air is always directed to the lower bucket; when a certain amount of water is forced up through the column pipe, the bucket rises (that on the opposite end of the lever descending) till it reaches the end of its course of three or four inches, when the compressed air-valve, A, is turned, so as to send the air into the other, now the lowest bucket, and, at the same time, to allow the escape of the air in the upper bucket. The operation continues, the water being forced from the rising bucket into the column-pipe, at a pressure equal to the pressure in the air, and the descending bucket filling as it goes down. It would be impossible to imagine anything more simple in its mechanism, or in its working, and the results obtained are claimed to be very satisfactory. There are so few parts, and those are so simple and strong, that there is little chance of break down or of wear. And as all the moving parts are under water there is no chance for them to freeze up. Cheapness and simplicity are the chief characteristics of this machine, and they are very desirable characteristics in any kind of a pump.

THE MINERAL WEALTH OF SOUTHWESTERN VIRGINIA.*

By C. R. Boyd, Wytheville, Va.

(*Concluded from page* 317.)

LEAVING our pyrites lode and its surroundings, we pass N.N.W. again, over an interval of about two miles, on our cross-section, of limestones, red slates, etc., holding here and there brown hematites and manganiferous deposits, and arrive at the Lick Mountain, an intrusion of Potsdam sandstones, and overlying and underlying strata, synchronous with the stiper stones, in the shape of a disturbed anticlinal for a part of it, and a succession of ridges for another part—an island of such, as it were, in the heart of Wythe County, giving way on every side to a limestone valley, in which, I think, may be traced such rocks as Professor EMMONS denominates Taconic. This I judge from similarity of description, and not from character of organic life, as I have found too little as yet to justify me in naming the strata on that score. In the southern escarpment of this Lick Mountain is a stratification of slaty brown iron ore more than one hundred and fifty feet thick (I did not follow its width further), containing about 25 per cent. of metallic iron, at least as to surface fragments, from which, no doubt, a great part of the iron in the ores of the valley is derived, being very elevated, and much exposed to the action of the elements. On a mile further to the north in this mountain is a vein of manganese ore, apparently binoxide, crystalline in part and very dense, the thickness of which I could not obtain, as the gentleman to whom the land belongs is just now about having the necessary developments made.

Following these strata either way you will find extraordinary surface quantities of both manganese ores and manganiferous iron ores. At one point, four miles south of the Atlantic, Mississippi and Ohio Railroad, called The Glades, in Wythe County, a shaft has been sunk into a deposit of manganiferous iron ore of irregular measures over four feet, having cavities in which hang stalactites of manganese oxide.

To revert again: near to our cross-section line on the Lick Mountain, and near the Potsdam sandstones that compose the heart of the mountain, is a measure of fire-brick clay, which I traced in the bed of a small stream more than 100 feet diagonally across it, not finding either wall of it; a specimen of which, with many of different ores from this region, is on exhibition with the Smithsonian Institution collection at the United States Centennial Building, as well as with the Virginia Mineral Bureau exhibit, and in a private collection of the New River Railroad Company at T 54, Main Building.

The northern or northwestern face of Lick Mountain, immediately facing the town of Wytheville, is a repetition in great part of the southern escarpment; only that the ores do not appear on the same gigantic scale. But it has its manganiferous iron ores, red and brown iron ores, fire clay manganese ores, and a thin stratum of slates giving traces of copper, near the northern base of the mountain. That part of our cross-section about the Atlantic, Mississippi and Ohio Railroad, transverse of it, that is either way E.N.E. and S.S.W., will prove an interesting one to the curious. Beginning thirty miles to W.S.W. in Smyth County, there are developments of barytes, the product of the mines having been for awhile shipped north. Following the line of the railroad eastwardly from the barytes, we find flattering surface indications of specular iron ores, and further on toward our cross-section line of copper ores. But these ores have evidently been left by some glacial action, as well as those copper ores which appear in such flattering quantities on the surface near Max Meadows Depot on the Atlantic, Mississippi and Ohio Railroad, eight miles east of Wytheville. By an analysis which I had made in Baltimore, there was 9.8 per cent. of metallic copper in ore found near Max Meadows. If it should be the surface outcrop of a sulphuretted copper vein beneath, it is very close to railway transportation, leading by one road to the seaboard 300 miles distant. Following our transverse-section five miles further eastwardly into the Peak Mountain on the Atlantic, Mississippi and Ohio Railroad, we have the outcroppings of a true anthracite coal, at the surface showing all the indications of a crushed vein, with a measure that was difficult to obtain when I was there; but it may be placed at a little less than three feet, although it appears larger. It is a sub-carboniferous coal, about here including quite an area of nearly flat dips, but presenting an appearance suggestive of faults and fissures. It deserves a very strict and close survey to determine its probable value.

Going back to Wytheville, and pushing northward across the Trenton and Calciferous limestones and sandstones two miles, we come to a vein of red hematite of a magnetic character, nine feet thick, perpendicular in attitude, in limestone and flint, showing surface indications each way half a mile, at intervals, which has been tried by the Tredegar Iron Works of Richmond, Va. Passing on N.N.W., three and one-half miles further on our cross-section line, we go over a great fault in the crust of the earth, and suddenly find the sandstones of the Sub-carboniferous and slates beneath them holding eleven seams of coal varying in thickness between three and one-half feet and a few inches. These veins have a general dip S.S.E., of about 35°, the coal containing enough bitumen to make a good coke at this point, and burning well in grates and stoves. It has never been remarked that any of this coal decrepitates in the fire. Still, as the measures have been subjected to quite different degrees of disturbance of different points, elements may have been interjected or percolated through at some points that would cause decrepitation of those coals.

Accompanying these veins above in the order of stratification is an eighteen-inch vein of black band, having its outcrop a hydrated peroxyd of iron, sometimes in hollow casts and nodes. These veins, as you go eastwardly along the southeastern escarpment of Little Walkers Mountain in which they occur, become more of an anthracite until you reach the Peak Creek Hills, and there you find the coal an anthracite as described above. Further eastwardly, in Pulaski County, it is nearly an anthracite in the southern face of Cloyd's Mountain. Following still further eastwardly into Montgomery County, crossing New River, the same veins are now mined very extensively for that section, having pretty regular measures from four to seven feet in thickness and less, nearly all pure coal—still with its rather high angle of inclination, S. S. E.

Going back to our cross-section line at the coal, about five miles in a straight line N.N.W. of Wytheville, leaving the great valley behind us, we strike into an alternation of lower and higher mountains. The lower mountains are composed in the central part of the Catskill sand-stones, underlaid by the tolerably easily recognized gradations down to the Marcellus and Hamilton slates and shales, with those strata such as the Corniferous, Oriskany, Lower Helderberg either left out or but feebly represented until you reach the Niagara epoch, generally with a strike E.N.E. and dip S.S.E. 35 to 40 degrees. In going N.N.W. from the outcrop of the Catskill, on the crest of the lesser mountain, we pass across the upturned edges of the next lower strata, descending into a valley that is composed mainly of Marcellus, Hamilton, and Genessee beds, and having a poor soil; we then begin to rise the greater mountain, passing through all or nearly all the Niargra sub-epochs until we reach the crest of the higher mountain, which is generally composed, as to its spine or centre, of the Oneida sandstone. After passing this you begin to descend very rapidly into a rich valley, passing through the Hudson shales and limestone, and generally going down into the calciferous, before that great fault occurs again which brings you face to face so suddenly with the sub-carboniferous sandstone. These mountains are generally monoclinal, with the exception of one great anticlinal of which I will speak presently. The condition above described may be the better understood by placing the two hands side by side horizontally, supposing them to hold all the strata from the calciferous up to the sub-carboniferous inclusive. Point the hands toward the E. N. E. to get the direction of our mountain; imagine a wave motion to exist across many hands so placed, and press all together, sliding the right hand upon the left; you have the Calciferous riding up on the Sub-carboniferous, with the lines between the hands representing the great faults; and if you will then consider that the elements have acted so much the more rapidly on the soft Marcellus and Hamilton shales, upturned at a high angle, you will find an explanation for the poor valleys.

This operation has been repeated across this section, or near it, four times, with the exception of a curved inticlinal in the case of the Round Mountain in Bland County, Va., and about six times between Peak Mountain and the sub-carboniferous measures in Tazewell County, in the south-eastern edge of the Great Kanawha coal basin proper, giving us quite a succession of nearly parallel ridges. In the south-eastern escarpments of the greater mountains, and doubly in the curved anticlinal of the Round Mountain, we have the ores of the Medina and the Clinton epochs, giving in the long lapse of time since they were thrown up beds of both iron and manganese ores of great value. The manganese ores are derived from two sources, a stratum of silica and manganese oxide combined, nearly about the junction of the Onedia and Medina (but the exact location I will determine by future observations), and a stratum of an oxide that underlies it. The iron ore, the red hematite usually, is a reduction from small flattened grains and petrifactions of specular red hematite, in shells of the Clifton, which, in fact, at points is left out. Still, the Clinton has a large development at short intervals, always making the mountain much thicker where it occurs; not only giving a very respectable stratum of ore of the small flattened grains, but also, in places, the most beautiful petrifactions of a perfect shell (Atrypa Reticularis, apparently,) in specular red hematite, as is the case on the south-eastern escarpment of Peters, or East River Mountain in Giles County, Va.

In this county, Giles, on the parallel section spoken of in the beginning of this paper, there are extraordinary developments of iron and manganese ores, notably, the Sinking Creek veins and deposits, which I will not fatigue you further by giving the measures and analyses of; but neither are objectionable. The red hematite ores, partially magnetic, are at CHAPMAN'S and PACK'S on New River, eight feet thick, inclosed, as to a portion of them, by brown ores, and showing, by analysis of MESSRS. BOOTH & GARRETT, 64.95 per cent. metallic iron and 50 per cent. phosphorus. This vein has been traced by me at intervals for twelve miles. It shows plainly at low water, crossing New River, very clearly defined in the bottom of the stream. On the Angel's Rest Mountain and the opposite mountain across New River are remarkable surface quantities of ores, together with very well defined deposits or veins of sandstones varying from a few inches to many feet, the measures of which I will be pleased to give in a future paper, as well as those of Peters Mountain.

Taking up our cross-section line again and following it N. N. W. over the crest of the last high mountain to a point about twenty-five miles in an air-line from Wytheville, and pursuing our course ten miles further, we pass across the remarkably fertile county of Tazewell, Va., eight miles in an air-line across the Bluestone and Abbs valleys, and strike about the terminus of the cross-section into the south-eastern edge of the Great Kanawha coal field proper, which here has a gentle dip inclining to the N. W., the measure aggregating here about forty-six feet of coal, one vein being eleven feet with one foot of slate, and another exactly four feet. But these measures are so nearly the same in character as the upper New River series spoken of in the works of Mr. M. F. MAURY, Jr., State Geologist for West Virginia, that I refer you to his admirable papers.

I have not said anything of the valuable salt and gypsum basin, twenty miles west of our cross-section line. It is hardly necessary. Mr. LESLIE, in his thorough report to the Shenandoah Valley Railroad, has pretty thoroughly explained that. I will reiterate a well-known fact with regard to the gypsum; namely, that it is 800 feet thick in the Holston Valley at one point, formed probably by water charged with sulphuric acid resulting from the decomposition of pyrites in the bordering rocks, coming in contact with the lime carbonates and so replacing the carbonic acid. There are other versions equally plausible.

There are ample quantities of charcoal timber in the region we have had under consideration to last until far into the time when stone-coal and coke can be had from Kanawha. If furnacemen in our section, or those contemplating it as the scene of their future operations, would avail themselves of the facts as set forth in the paper of Mr. I. LOWTHIAN BELL, lately read before this Institute, there can be no doubt, with the kindly ores in which this district abounds, that a maximum production of an excellent quality of gray pig can be secured at a maximum cost, allowing a very fair margin in even these times; and, too, over lines of transportation that are considered now to be costly to the shipper. Prof. NEWBERRY says: "Charcoal may, however, be produced

* A paper read before the American Institute of Mining Engineers, at the Philadelphia meeting June 1876.

here in abundance for many years, and the excellent bituminous coals of East Tennessee and West Virginia will be within easy reach. We may expect, therefore, that this will in the future become one of the most important centres of iron production in the United States." May not the same be said with equal truth of the great copper lodes, and the lead and zinc lodes? One of these I have not described, lying in Bland with an extension into Giles County, but not having developments sufficient for measures to be taken; and still another just below the Peters or East River Mountain near New River.

Of the mineral springs for which this region has been famed, I have also said nothing. But where there are sulphureted strata which also contain other valuable medicinal minerals, it may be inferred that there would be a great many springs of the highest efficiency as medicinal agents. The veins of variegated marble, of lithographic stone, and of corundum will not be forgotten in a future paper.

I hope the mining engineer and the scientist will hereafter visit this really interesting locality more frequently. I know that I but express the real, heartfelt sentiments of the majority of the people of Virginia, when I extend to the guests and members of this Institute a cordial invitation to come and make themselves familiar with her boundless mineral resources. Though the Virginia people have principally been reared to agricultural pursuits, I have never seen those of my section fail to extend all the facilities in their power to those who earnestly desire to develop her mineral wealth, whatever quarter they might come from. Could we but have the advantage there of the intelligent labor of men like our host of the Philadelphia and Reading Railroad, how short would be the time until our section would teem with the life and the activities that we saw along the route of our late excursion!

THE LOWE WATER-GAS QUESTION.

THE EDITOR—Dear Sir: In your issue of the 11th instant Mr. WM. KENT "indefinitely postpones" the usefulness of the Lowe process, by showing that the water-gas produced by it represents a large loss from the theoretic heat-units of the coal burned in producing it. This was admitted in my former statement; but his comparison is unfair, in ignoring all the considerations which, in practical calorics, modify the mere theoretic values. It would also have been clearer if he had made his comparisons between a ton of coal and the gaseous products of a ton, than as he has done, between a ton of coal and 1,000 feet of gas.

Moreover, the results obtained by the Howard boiler, as quoted by Mr. KENT, if, indeed, accurately ascertained, is entirely exceptional to an ordinary result in general heating operations. Professor GRUNER and others are authority for the statement that a utilization of 20 per cent. of the total heat is a high result by Ponsard and Siemens' furnaces. But even allowing a bare comparison, independent of all the questions which largely affect practical operations, it would stand as follows:

Coal.	Gas.	Heat-units.		Lowe.	Siemens.
		Theoretic.	Howard Boiler.		
2,000 lb.	45,454 c. ft.	27,000,000	18,900,000	15,604,712	5,400,000

In the above computation the gas is estimated at a temperature of 70° Fahr., while in practice it may, in many cases, be delivered at its high initial temperature (say 1,200°). It is, of course, admitted, that in converting the carbon of the coal into CO, there must, inevitably, be an expenditure of its heat-units, and especially if the initial heat is lost. But the question was, and still is, whether, after allowing for such loss, is it not more than compensated by the form of fuel gained—a fuel not involving the labor of handling, one of easy distribution, giving an intense and uniform heat, and capable of perfect control. These questions, I take it, have been settled among metallurgists, by their adoption of the Siemens' gas furnace, with which my comparison was made, and would be still further confirmed by application to many other uses, if not to the generation of steam.

I am gratified by the interest Mr. H. M. HOWE shows in the figures presented, and will furnish him additional data with some explanations, reminding him first that the Lowe process has been employed thus far almost exclusively in connection with the manufacture of illuminating gas, and hence the facts given in my paper are necessarily deductions from such operations.

With an apparatus faulty in construction and wasting much heat by radiation, we find that 50 lb. of anthracite coal (Lehigh). and 3 gallons of crude petroleum, will deliver 1,000 cubic feet of purified illuminating gas, measured at say 70° Fahr. This amount of fuel includes that burned in firing up, and also that used under the boiler, the latter being in the proportion of 17 lb. On favorable occasions we have reduced the total to 44 lb. The proportion of coal expended in the making of steam is largely, if not wholly, unnecessary, as the apparatus delivers gas at the rate of 20,000 cubic feet per hour, with a temperature of 1,000 to 1,200° Fahr., which heat, properly utilized, should save much, if not all, the fuel now employed in the generation of steam. Another defect in the present operation of the Lowe system is that the blast is carried in cold, while the waste products (hot nitrogen) are allowed to escape through the smoke stack. These might be compelled to exchange conditions with the air, and so further economize fuel. Another serious drawback exists at Manayunk in the inefficiency of the boiler, which gives a pressure of only about 45 lb., and is remote from the generators delivering steam so wet as to rapidly lower the temperature. These points are mentioned to prove that the maximum of economy is by no means attained.

Nevertheless we have, as before stated, obtained even under these disadvantages 1,000 cubic feet of finishing illuminating gas of about 20-candle power, from 44 pounds of coal, and 3 gallons of petroleum. As we know by the direct introduction into the fire chambers, some portion of the oil is burned and that a further portion is deposited in the crevices of the superheater in the form of fixed C., and subsequently consumed therein when the blast is re-applied (though how much in either case we cannot, from the nature of the operation, absolutely state), we conclude that we do not obtain the full volume of H. and C., with which the oil is theoretically credited. Judging by the proportion of illuminating matter to the 1,000 cubic feet of gas sent out (approximately 10 per cent. of volume), we infer that the proportion of fuel expended in vaporizing and gasifying the petroleum would give an equivalent volume of gas, if steam were substituted for the oil. There are difficulties in the way of an absolute determination of some of these points, and I shall have to be content at present with giving Mr. HOWE these facts, allowing him to approximate the proportions of the gases derived from the various sources. The amount of water evaporated and of ashes drawn (the latter inconsiderable, so far as generator is concerned), are yet to be ascertained. I must remind Mr. HOWE, however, that the figures given by me in the JOURNAL of 4th inst. were based upon pure water-gas without oil. If in our deductions we have fallen into error, or been over-liberal, we will frankly admit it and mend the figures, confident that the process has a large margin, and can bear any necessary corrections. I should be much pleased to hear from him or any other parties interested in the subject, and will gladly furnish any information at hand or obtainable, and gladly avail of practical suggestions for further examinations.

Will not some gentleman, fond of figuring, furnish an estimate of the exact influence upon combustible gases of initial N. and CO^2, and to what extent they reduce the calorific value, when in the following proportion, say: H 7; CO 17; CO^2 7; N 69?

Very respectfully,
GEORGE S. DWIGHT.

NEW YORK, November 13th, 1876.

THE COPPER LODES OF COLORADO.

Special Correspondence of the Engineering and Mining Journal.

THE Malachite Lode, discovered in 1865–66, lies in the north half of the north-east and north-west quarter of Section 30, Town. 4 S., Range 70 West 6th Meridian. The course of the lode is very nearly east and west; it is a vein, whose country rock is a Syenitic granite, easily weathered, and decomposes in many places by a sort of concentric foliation. In this rock occurs magnetite, iron pyrites, hornblende, quartz veins, and dikes or veins of a deeper red granite, with ordinary white mica, occasionally parts are very near "rhyolite." Crossing the Malachite Lode are two other cross veins; some call them "spurs," erroneously. These cross veins are parallel to each other, and have a general course from north-west to south-east. These lodes are, respectively, called the Callom and the Puffer Lodes.

The east end of the Malachite lode, which crops out at the foot of a peak some 500 feet high, has been exploited by a tunnel, penetrating from the out-crop into the vein, 135 feet in depth. From this tunnel no very large amount of ore has been extracted; a good deal of felspar and white quartzose granite, in vein gangue minerals, produced copper and iron pyrites, and some arsenical iron. The best ore taken out has yielded in average of assays—Au. 1 oz.; Arg. 20 oz., Cu. 10 per cent.

West of tunnel is the fine old Discovery shaft, 75 feet deep. This shaft has, from the surface, produced a good deal of good ore. The surface yielded a mixture of green carbonate copper, black oxide copper, and red oxide copper. At about twenty to thirty feet carbonates nearly all disappeared, as well as the red oxide, copper pyrites taking their place. Minerals found are copper pyrites, with some iron pyrites, and also magnetic pyrites, mixed with the copper pyrites. Average assay—Au. ¾ oz.; Arg. 12 oz.; Cup. 12 per cent.

West of this shaft is the shaft on the junction of the Malachite and Callom Lodes, shaft 122 feet deep. From the bottom of the shaft we obtain copper pyrites. Average assay—Au. 1½ oz.; Arg. 16 oz.; Cup. 13 per cent.

Still farther west of the old shaft is another one, sunk down 45 feet, to test the junction of the Puffer and Malachite lodes, also west of the Callom lode. The surface of the covering of these two lodes (Malachite and Puffer) was indicated by the discovery of yellow, white and green silicates of copper. At this date the vein stuff is decomposed, and all highly impregnated with carbonates of copper, while for a short distance down the shaft red oxide of copper was found in abundance, mixed with silicate of copper.

We would here remark, that at the junction of Callom and Malachite lodes, red oxide of copper was taken out by the ton, for a long distance down; the richest red oxides yielding as high as 80 to 82 per cent. copper. The discovery of the cross lode to the Malachite lode, was due to the fact, that at this place was an old shallow shaft, which being cleared out, and the vein of oxides and carbonates, then some 2½ feet thick, laid bare, old pre-historic, or Indian relics, were found in the bottom, such as a rough pick, made out of an elk horn, the jaw of a buffalo, and some slate chips. We believe the green carbonates were used as a pigment by the miners. One mile west of the Callom lode, the Malachite lode also yields zincblend, and occasionally a little lead.

GOLDEN, Col. E. L. B.

NOTES.

AVERAGE SELLING PRICE OF COAL IN WALES.—The average net selling price per ton (2,240 lb.) of colliery screened large coal of the following descriptions, delivered f. o. b. at Cardiff, Newport, and Swansea, in the six months ending the 30th June, 1876, was: Group 1, Steam Coal, 10/ 3d. per ton; Group 2, Mynyddislwyn and Tillery, 10/ 4d.; Group 3, Rhondda Coal, 10/. These prices have been adopted as the "basis" on which to graduate wages to be paid on "the sliding scale" from June 30th to December 31st, 1876. The rates of wages paid will be found in another page of the JOURNAL.

NEW METHOD OF MANUFACTURING CAR WHEELS.—KRUPP, the well-known iron master of Prussia, has lately patented a most ingenious mode of manufacturing car wheels. A skelp is first formed on a long flat plate of iron, with a central rib above and corresponding groove beneath, and wide at each end. One end is secured to a rotating mandrel and is coiled on itself, forming the hub; the coiling being continued, the narrow portion of the skelp is wound on itself, forming the web; the coiling of the outer wider end forms the rim. The blank thus formed is placed in the furnace, heated to a welding heat, and welded under pressure into a homogeneous mass of the proper shape, forming the completed wheel. Apart from the facility of manufacture, this invention results in the production of an article of very superior merit, as the fibres of the iron are all arranged parallel to the periphery instead of tangential or radial, as in wheels constructed by processes hitherto persued.

NEW CALEDONIA NICKEL.—Our contemporary, *La Houille*, extracts the following article on nickel in New Caledonia, from a paper published in that colony:

"Nickle has now so much importance in our colony, that we intend to give an article on it every month, so as to keep our fellow colonists informed of the value of their produce in the markets of Europe, and, in the second place, to give really true accounts of the quantities exported, the number and value of our mines, and the kind of people we are. After doubting for a long time the reality of discoveries made near the end of 1874 at Mont d'Or, about eighteen and a-half miles from Noumea, our people at length began to explore for nickle with great zeal and activity. The presence of ore was proved at a large number of places in our island, and people began to believe that mines might be opened anywhere and everywhere, and that we were about to enter on a period of unlimited production. Fears were entertained of a deficincy of ships to take the ore away, and it was imagined that Europe and America together would hardly consume all that was going to be raised. But these dreams and exaggerations were soon over, and the present position of affairs is that the total amount exported in the course of the past fourteen months—*i.e.*, from the date of the earliest extraction to the present day—is 2,000 tons. The Boa Kaine sends away from Canada to Germany every month about 125 tons; the Bel-Air mines at Ouaillon have raised 1,200 tons, of which 160 tons were sent to London at the beginning of 1875. In April, 1876, 550 tons were shipped for Havre per the *Buffon*, and in May 430 tons by the *Nouveau-Mondelli*. The remaining mines, all told, including the Fatma mine, have not sent away more than an aggregate of 100 tons. About the end of next month (August?) 560 tons will be shipped on board the *Indien* for Havre. That is the whole truth about the heavy shipments of which we have heard varying accounts

COMPARATIVE ADVANCES AND REDUCTIONS IN COLLIERS' WAGES IN ENGLAND, SCOTLAND AND WALES.

WE have received from official sources the following interesting information with regard to the wages paid English colliers since 1871, when the increase commenced, which culminated in 1873 :

DATE.	East Scotland.		West Yorkshire.		Lancashire.		Monmouth and S. Wales. Bituminous.		Somerset.		Durham.		South Yorkshire.		Cumberland.		Northumberland.		South Stafford.		Wales. Steam.		N. Wales.		North Stafford.		Dean Forest.	
	Advance.	Making.	Advance.	Making.	Advance.	Making.	Advance.	Making.	Advance.	Making.	Advance.	Making.	Advance.	Making.	Advance.	Making.	Advance.	Making.	Advance.	Making.	Advance.	Making.	Advance.	Making.	Advance.	Making.	Advance.	Making.
1871.	Dat'm 4/6 pr day.						Dat'm 2/6 pr ton.																					
	s. d.	pr. ct.	pr.ct	pr. ct.	p.ct	pr. ct.	s. d.	pr. ct.	pr. ct.	p.ct.	p.ct	pr. ct.	p.ct	p.ct	p.ct	pr. ct.	pr. ct.	pr. ct.	pr. ct.	p.ct	p.ct	pr. ct.	p.ct	pr. ct.	p.ct	pr. ct	p.ct	pr. ct	p.ct
August	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2·5	.....	.....	.....	.....	.....	.....	....
September	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	.....	.....	.....
October	.....	.....	7	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.. ..	11	....	...	.....	5	.....	.....	...	5	....
November	0 6	11	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
December	0 6	21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1872.																												
January	.....	.....	10	18·25	5	15·5	0 3	10	10	.....	.....	.....	.....	.....	5	10·25	.....	.....	.....	....	...	.....	5	10·25	.....	....	.....	....
February	.....	.....	.....	.....	2·5	18·45	0 2	20	.....	.....	20	.....	.....	.....	.....	.....	10	.....	18	29	10	12·5	.....	.....	10	21	5	10
March	0 6	32	.....	.....	.....	.....	0 1	13·33	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	...	.....	.....	.....	.....	.....
May	.....	.....	.....	.....	.....	.....	0 2	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
June	.....	.....	15	36	10	30·25	.....	.....	.....	.....	.....	.....	10	20	5	15·75	.....	.....	.....	..	10	23·75	5	15·76	.....	.....	.....	....
July	0 9	47·5	.....	.....	.....	.....	.....	.....	10	20	15	38	.....	.....	10	27·25	22	32	.....	.....	.....	.....	5	21·5	10	33	10	20
August	1 0	69·25	.....	.....	.....	.....	0 4	33·33	10	30	.....	.....	.....	.....	10	40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....
September	.....	.....	15	56·4	15	50	0 2	40	10	40	.....	.....	7·5	37·5	10	54	.....	.....	.....	.....	10	36·12	10	33·70	.....	.....	10	30
October	0 9	85·25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1873.																												
January	Rd. 1s	63·5	.....	.....	.....	.....	.....	.....	10	50	.....	.....	.....	.....	.....	.....	.....	.....	10	40	...	.....	.....	.....	.....	.....	.....	.....
February	.....	.....	.....	.....	.....	.....	.....	.....	10	60	15	58·7	.....	.....	.....	.....	.....	.....	10	50	.....	.....	.....	.....	.....	.....	.....	.....
March	1 0	85·25	15	79·8	10	65	.....	.....	.....	.....	.....	.....	20	57·5	.....	.....	18	50	.....	.....	..	.....	10	47·07	10	46	10	40
April	.....	.....	.....	.....	.....	.....	0 3	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	.....	.....
May	.....	.....	.....	.....	.....	.....	0 3	60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	49·73	.....	.....	.....	.....	.....	.....
Total advances	.....	85·25	.....	79·8	....	65	.....	60	.....	60	....	58·7	....	57·5	....	51·5	.....	50	.....	50	....	49·73	....	47·07	.....	46	.....	40
	Reduction.		Reduction.		Reduction		Reduction pr. ct.		Reduction.		Reduction		Reduction		Reduction		Reduction		Reduction		Reduction		Reduction		Reduction		Reduction	
1874.																												
February	1 0	63·5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
March	.....	.....	.....	.....	15	40·25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20	30	.....	.....	.....	.....	.....	.....	.....	.....
April	.....	.....	.....	.....	.....	.....	.....	.....	23·5	36·5	10	42·8	.....	.....	.....	.....	10	40	.....	.....	.....	.....	.....	.....	10	33	.....	.....
May	1 0	39	.....	.....	.....	.....	10	44	.....	.....	.....	.....	.....	.....	17·5	34	.....	.....	.....	.....	10	34·76	10	32·36	.....	..	10	30
June	..	.....	12·5	57·4	.....	.....	.....	.....	.....	.....	.....	.....	Off	Gross	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....
July	15 p.c.	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12·5	37·8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	21	.....	....
August	.....	.....	.....	.....	.....	.....	10	29·6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	21·29	...	.....	.....	.....	.....	....
September	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11	19	.....	.....	....	.....	.....	.....	.....	....
October	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14	26	.....	.....	.....	.....	.....	.....	.....	.....	.....	....
November	.....	.....	.....	.....	10	26·25	.....	.....	.....	.....	9	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....
1875.																												
January	.....	.....	*12·5	34·85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	25
March	15 p.c.	All off	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	27·8	10	24	Steam Coal 10 / Soft Coal. 12·5	Coal 16 / 13·5	.....	.....	.....	.....	.....	.....	.....	.....	.....	....
April	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	23·5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	5	20
May	.....	.....	.....	.....	.....	.....	12·5	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	12·5	6·13	10	19·13	.....	..	.....	...
June	.....	.....	.....	.....	.....	.....	.....	.....	15·25	21·25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10·5	10	.....	....
July	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	..	.....	.....	.....	5	15
September	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15	1·26	.....	.....	.....	....
November	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	14	.....	.....	.....	.....	.....	.....	.....	.....	2·5	7·5	.....	....
1876.																											ad'cd.	
January	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	7	.....	...	...	.....	....	5 reded	20
February	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	14·86	.....	.....	.....	.....	8	St'm 8 / Sft 5½	.....	.....	.....	.....	.....	.....	.....	....	10	10
April	.....	.....	.....	.....	.....	.....	.....	.....	11·25	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....
June	.....	.....	12·5	18	.....	.....	.....	.....	.....	.....	.....	.....	12·5	11·3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	...	.....	....
July	.....	.....	.....	.....	15	7·32	.....	.....	.....	.....	.....	.....	.....	.....	8	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....
September	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	7·86	.....	.....	.....	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	..	.....	....
Present state above 1871.	.....	.....	.....	18	....	7·32	.....	16	.....	10	....	7·86	....	11·3	....	6	Steam Coal. / Manufac't'ring		....	19	....	.....	....	1·26	.....	..	.....	10
" below 1871	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1·29	.....	.....	.....	2·5	.....	....

* Off prices ruling in March, 1874, and to stand for six months.

WAGES AND ALLOWANCES OF BRITISH COLLIERS, SEPTEMBER, 1876.

EAST OF SCOTLAND—Hours per shift, 8 ; wage per shift, 5s.

WEST YORKSHIRE—Hours per shift, 7 ; wage per shift, high coal, 5s. 4d. to 7s. 3d ; low coal, 4s. 10d. to 5. 8d. ; no houses. Coal at getting price to half selling price.

LANCASHIRE—Hours per shift, 8; wage per shift, 5. 8d. Find their own houses and pay market price for their coal.

MONMOUTH AND SOUTH WALES (Bituminous)—Hours per shift, 8 ; wage per shift, 6s. ; no cottages. Fire-coal delivered at from 4s. to 7s. per ton. Sliding scale adopted in Jan. 1876.

SOMERSET—Hours per shift, 7; wage per shift, 3s. 4d. to 4s.; no cottages. Fire-coal, powder, candles, gear, etc., free.

DURHAM—Hours per shift, 5¾; wage per shift, 5s. to 7s. 6d.; houses free. Fire-coal, 6d. per pay leading.

SOUTH YORKSHIRE—Hours per shift, 8 ; wage per shift, 5s. to 6s. 7d.; no cottages found. Fire-coal—some pay full price, some a reduced price, but none free.

CUMBERLAND—Wage per shift, 5s. 4d. to 8s. 6d. Neither house nor coal allowed.

NORTHUMBERLAND—Hours per shift, 5¾; wage per shift—steam, 6s. 9d. to 7s. 6d., soft coal, 5s. 11d. to 6s. 6d. net ; houses free. Fire-coal 6d per pay leading.

SOUTH STAFFORDSHIRE—Hours per shift, 8 ; wage per shift—thick coal, 6s., thin coal, 4s. 6d. Sliding scale adopted July, 1874.

MERTHYR, ABERDARE, RHONDDA, AND SOUTH WALES (Steam)—Hours per shift, 8; wage per shift, 6s. ; no cottages. Fire-coal delivered at 4s. to 7s. per ton. Sliding scale adopted January, 1876.

SOUTH WALES—Hours per shift, 8 ; wage per shift, 5s. 8d ; no cottages found. Coal at ha selling price.

NORTH STAFFORDSHIRE—Hours per shift, 8 ; wage per shift, 5s. 0¾. House and coal not found by owners.

DEAN FOREST—Hours per shift, 8 ; wage per shift, 5s. 3. ; no cottages found. Fire coal, 8s 4d. per ton.

ABSTRACTS OF LECTURES ON MINING.—No. XVIII.

By Prof. W. W. Smyth, M.A., F.R.S., Royal School of Mines, London.

(From the London "Mining Journal.")

BEFORE proceeding to the consideration of the actual blasting, we must look a li tle closer at the hammers employed in preparing the holes. These are either single-handed or double-handed ; the former are for use by a man holding the borer or wedge in his left hand and the hammer in the right (or *vice versa*, for a good miner should be able to interchange the offices of his hands with facility, to meet various positions) ; the double-handed hammers are for a striker using both hands, while another man holds the bar. The single-handed hammer from Cornwall is of very much the same form as that used for boring holes of larger dimensions ; on the Continent they have a somewhat different form, for their being held shorter. The hammer head is mostly of iron, with a face or pane of steel ; in our own districts this face is usually circular. If it be objected to this circular form that it is more difficult to strike a blow on a small object, it may be replied that in case of missing the hammer would glance off, and the hand would not be struck ; whereas in the more clumsy continental forms, although less likely to miss, if they do so there is a great chance of hitting the hand. Some years ago in some districts (especially the Forest of Dean, where the practice was first introduced, and in West Cornwall) the plan was adopted of purchasing the hammers from manufacturers on a large scale, instead of having them made by the smiths on the mine. The hammers in this case were made entirely of steel, and in great part of Mushet steel. Double-handed boring, where it has been employed is, on the whole, preferred to single boring, for the facility with which bore holes of considerable diameter may be put down in hard rocks. Although two men, working singly, could get through more ground than when working double, still the bore-hole in the latter case would give more power, and is also preferred for the amount of relief it gives the men in alternately striking and turning. In some of these hammers the weight (which in a single-handled hammer is from 5 to 9 lb.) is concentrated into a small space, with the eye set in the mass of the iron, so that the heft is not only held very firmly, but the eye is less likely to break out. The hammers are generally made from square bars, the edges being strongly champfered off as a rule.

By referring to the collection of mining tools in the Mu-eum above, it will be seen how very varied is the form and weight of the hammer in different districts, and inasmuch as this is an every-day and all-day tool with the miner, these details are not to be regarded as unimportant. The double-handled hammers for wedging in the coal are of much greater length, with round, or nearly round, faces. In some exceptional districts (the lecturer had met with one or two in Italy) they preferred the hammer head to be entirely of soft iron, without any steel at all, and they allow the head of the borer to penetrate quite deeply into the head of the hammer ; such a thing is quite unknown in this country and in the regular mining districts of North Europe. The depth to which the bore-hole should be carried depends on several circumstances—the nature of the ground, the position of the mass intended to be taken off, etc. Generally single-handed holes vary from 9 to 18 inches deep, double-handed

from 1 to 2½ or 3 feet. In some classes of rock we cannot put down deep bore-holes with advantage. For instance, if the ground be full of planes of division, whether of stratification or those running in all directions through mineral veins or slatey cleavage joints, in all these cases, as well as in cavernous ground, it would be to no purpose to put in deep bore-holes. The bore-holes must then be multiplied, and put in shallower. Else otherwise the powder is apt to find its way into some of these irregularities, and the ground will be likely not to tear up from the bottom of the hole, so that time and labor will have to be spent in vain. Where the powder has to be used in the manner in which the men generally prefer to use it—as loose powder—it will be necessary to line the hole with clay (bulling is the North of England term), in order to prevent as far as possible the infiltration of water. The clay is plastered around the sides and bottom of the hole by the means of a claying or bulling bar, which is driven down to the bottom with a hammer, if necessary. The object is to force the clay into any cracks or irregularities at the side of the hole, and to render the sides as smooth as possible; the bar is provided with an eye at the top, for the purpose of inserting a bar through to remove it if it should stick fast, or if it be square it is turned round by a key to loosen it.

The question has been much agitated of late years as to whether it would not be possible to abridge the time and labor spent in preparing these holes by calling in the aid of machinery. The problem is by no means a new one; it has been propounded for many years, and a great number of inventions have been brought forward to solve it; but it is far from satisfactorily settled yet. One reason in part why some of these have failed is that the inventors have not realized the fact that a good deal of the ground to be worked is considerably harder than the steel used for the tools, and, therefore, no tool in the form of an augur or scoop can succeed. Advantage must be taken of the brittleness of the rocks, and the machine must work by the method of chipping, in order to make way in this harder ground; and within the last fifteen years a number of machines on this principle have been brought forward. Of course, in all these cases of boring the first and most important point is to select the locality and direction for the hole; but we will not deal with that just at present. The next is as to the best method of working, the number of blows to be given in a minute in order to make most progress, it being well known that some rocks yield better to a large number of small blows than to a smaller number of heavier blows, and this question of velocity is one of the elements for consideration in these machines. An ingenious machinist at Freiberg, some years ago, CARL SCHUMANN, brought forward a machine of this kind, which we cannot say was ever fairly employed practically. Slightly modified by Mr. SOMMEILLER, the engineer of the Mont Cenis Tunnel, it was employed in the bulk of that great work, and, apparently, very successfully. But this is no proof that it could be adopted in mines; there is a great difference between having a large railway capital at your back, and the aid of two States, and having only the moderate capital of a mining company to deal with. It is very difficult to assert that an amount of economy was obtained which would have suited it for use in affairs of less political importance, and with the aid of far less capital. The principle has been the same in most of the machines brought forward—namely, the boring tool should be in connection with the piston rod of a small cylinder, with only a few inches stroke, and capable of giving a large number of blows per minute. In SOMMEILLER'S machine the usual number of blows was from 140 to 180, but this was capable of being increased to 250 or 300. In the Mont Cenis Tunnel the working drift in which the machine stood to work was about 10 feet square, eight borers were worked together, pointing in various directions over this 100 square feet of face. The machine, of course, has always to be so mounted as to advance forward as its work progresses, and also to be drawn backward out of the way of the shots while they are being fired For mining purposes much of the carriage used in the case referred to is done away with, and in some cases the machine can be readily carried to the place where it is to work, and there be fixed in position. One important question for the miner is that of the power to be employed in working such apparatus, and it is a serious question how to get sufficient power to the place where the work has to be done. At one end only of the Mont Cenis Tunnel, as much as £60,000 had to be expended in providing apparatus for compressing air, etc., in order to work the boring machines. The lecturer was sorry to say that, although he had visited a large number of places where such machines were announced as about to be introduced, he had only seen two or three actually at work underground. At present we must look on them as a sort of experiment, and in many cases, from one cause or other, these experiments have been brought to an untimely end. Among those which have been tried may be mentioned the machine of SACHS, which has worked very satisfactorily in the Harz; that of Mr. DARLINGTON, which appears to have certain advantages of simplicity of construction; that of Mr. MCKEAN, which is now doing good work in connection with the Mount St. Gothard Tunnel; the Inversole, Warsop, and Burleigh machines, and others. One of the great disadvantages, however, in all these cases is to get sufficient power up to the boring apparatus. Unless such machines are to be supported by a large capital, the great wear and tear of the apparatus, and the time spent in moving and placing them in position, militate greatly against their general use Two experiments are now going forward in Cornwall in testing these machines—at Agar and Dolcoath Mines. The Diamond boring machine has been employed most notably for deep borings; where employed for the borings we are now considering it has given good results, but as a matter of economy it is not likely to be used very frequently.

Another important question for the miner, which also at present is unsettled, is the character of the materials he may best use for explosives. At present the majority use blasting powder of one kind or another. A number of different substitutes for the ordinary powder have been proposed, some claiming greater cheapness, others greater safety, and so on. Among these may be mentioned white gunpowder, powder in which soda nitre is used, and a third variety in which two different materials, perfectly safe while separated, were to be mixed at the place of blasting when required. Nitro-glycerine was employed in some parts of this country, and gave great satisfaction, before Parliament, on account of its dangerous qualities, surrounded its use with so many stringent regulations and penalities that it is seldom likely to be used, and dynamite or guncotton are now the chief materials to compete with gunpowder. One of its most valuable qualities was that it could be put into a hole full of water, and the fuse after it, and would still be effective. Guncotton, at first brought before the world by Professor SCHÖNBEIN, is made in a form suitable for blasting by being rolled up into small cylinders, which are placed in the hole one above the other, in number according to the size of the hole. This variety was found very serviceable, but has been almost entirely replaced by Professor ABEL'S compressed guncotton. In the use of this guncotton it has to be "tamped" in a manner totally different from that employed when gunpowder is used. Dynamite, brought forward by Mr. NOBEL after the check put upon nitro-glycerine, is an admirable explosive for the miner, and when the directions issued by that maker are carefully followed its use may be very safe. Considering the extent to which these new kinds of explosives have been introduced among miners during the last few years the accidents have been comparatively, very few, and when they have occurred, in many cases they have been due to the men flying directly in the face of the regulations. For example, men have been known to place frozen dynamite (which has to be used in a pasty wet condition) on a shovel over the fire to bring it into a proper state, or on a stove, both methods highly dangerous, because the actual temperature could not be known; the proper method would have been to heat it cautiously by steam or hot water, the temperature of which ought to be accurately ascertained. Other substances, as lithofracteur, etc., have been proposed, but those named above are chiefly employed. If, then, we are about to blast with powder, and have the hole ready bored, the powder is introduced and pushed down to the bottom by means of a cylindrical piece of wood, the sides of the hole being cleaned as much as possible from adhering grains of powder. It is necessary to see that the men do not use an iron or steel tamping bar for this, which might easily strike a spark with some quartz pebble present; and by the recent Act of Parliament it is necessary to furnish the men with something besides iron and steel for tamping. The essential point is that the powder where it is introduced should occupy all the inequalities of the hole, that it shall be removed as far as possible from the top of the hole, and that as much room as possible be left for tamping, for the mass of the material above the explosive must be as near as possible as hard as the rock, otherwise the bore-hole would merely serve as the barrel of a gun. And hence the value of using gunpowder of strong character, or other stronger explosives, because a charge of the same strength occupies less room than one of the weaker material, and consequently leaves more for tamping purposes; and with the strong explosives, such as nitroglycerine, dynamite, etc., the advantage is a very important one. It is said that it was very nearly being introduced into the Act of Parliament that the men should not carry loose powder, but should use cartridges only. Such a provision would, undoubtedly, have led to many accidents, for one of the first things the men would have done would have been to open the cartridges, because you cannot with a cartridge get the powder so near to the bottom of the bore-hole, and filling up all the space not so well tamp it as with loose powder. One reason of the efficacy of the dynamite is that, owing to the soft pasty nature, you can get it well to the bottom of the hole. A series of experiments, the results of which were published in a Blue Book, showed clearly that this necessity of getting the charge as near the bottom as possible held in the case of gunpowder, in spite of the objection which may be raised that it is by no means a safe thing to force it down. The tamping material used varied considerably; dry sand has been used very successfully, and was reported on very favorably by the French engineers in cutting the Alpine roads during the Napoleonic wars. In the mines it is much better to use dried clay, or powdered brick, or killas, where you can make sure that it contains no fragments of quartz, or such like material.

Many accidents have occurred, especially in railway cuttings, by the men taking for tamping almost any material at hand without examining its nature carefully to see if it contains anything likely to cause risk. It is usual to put a little wad of paper, wood, etc, to prevent the tamping-bar striking a spark on the powder, and it is also desireable to put down the first portion of the tamping with a wooden bar. Since 1820 it was suggested that in consequence of the obvious danger of a spark being struck by the striking of an iron or steel tamping-bar against the sides of bore-holes, and this being led down to the mass of powder below through a few grains left on the sides, that a shoe of copper or brass should be attached to the end of the tamping-bar, and this has been the means of getting over a great number of accidents which used to occur. While the tamping is carried on connection with the powder below is kept up by means of a long needle, around which the tamping material is rammed.

In some cases this is of iron or steel, and there is then a great liability to accidents, except in very soft ground; in other cases a bar of wood, or copper, or brass is employed, or a totally different method of firing the charge is adopted—by means of a safety fuse. When the needle was withdrawn the hole was filled with a train of powder, and at the top a little snuff or match, formed of a piece of string dipped in sulphur, was placed so that when it was lighted it would give the man time to escape. Another method of firing used formerly was by means of goose quills filled with fine powder. In Russia a slip of wood coated with mealy powder is used. In Cornwall, where these accidents used to be very frequent, safety fuses have been introduced with good effect. These safety fuses are made in coils of 40 to 50 feet long, sometimes specially intended to resist the action of water, and they will fire a charge under water if necessary. In using the safety fuse it is wedged in the tamping instead of a needle, and occasionally in the process of tamping it becomes cut in two, especially with careless work, and then you have a misfire.

NOTES.

CALIFORNIA FIRE AND POTTERY CLAY.—Works with a capacity of about fifteen tons of clay per day have been erected in Placer, California, for the purpose of manufacturing pottery etc., from the large beds of excellent clay found in Placer and Lincoln Counties,

THE END OF THE GREAT OIL PIPE LINE.—The *Bulletin of the American Iron and Steel Association* says: "The much-talked about petroleum pipe line from the oil regions of Pennsylvania to the seaboard is an exploded chimera The scheme has entirely fallen through, and the principal projector has narrowly escaped going to jail.

COMPRESSED AIR AS A MOTOR FOR STREET CARS.—A car propelled by compressed air has been used successfully for more than two months on a street railway near Paisley, in England, under every condition of traffic and weather, performing a trip of three miles for each charge of air, at a cost of about one cent a mile. When the rails are not slippery with mud or ice, a considerable su plusage of air is left in the tanks.

SAN FRANCISCO TREASURE RECEIPTS.—In explanation of the receipts of treasure at San Francisco for the nine months ending October 1, as per returns of WELLS, FARGO & Co.'s Express, showing a large preponderance of silver, the San Francisco *Bulletin* says that "the silver bullion reported would be more properly denominated dore silver, as most of it contains from 40 to 60 per cent., gold. It has been the custom to report all such shipments as so much "silver bullion." It further says: In summing up we find the following points—First, that our actual bullion receipts for the nine months ending October 1 were nearly 25 per cent. larger than the amount received through the express company; second, instead of being 78⅛ per cent. silver and 21½ per cent. gold, as the express returns show on their face, the actual receipts were 51⅛ per cent. gold, and 38⅝ per cent. silver. This point is very important, and it is well for all interested in the bullion market to bear it in mind. We do not wish to be understood as reflecting upon the reliability of the express returns. The company are not to blame for the character given to the bullion shipments, nor do they pretend that the amounts carried by them represent the total deliveries at San Francisco.

INTERNATIONAL EXHIBITION OF 1876.

ADMISSIONS FOR THE WEEK ENDING NOVEMBER 16, 1876.

Date.		Paying Visitors.	Press, Complimentary, and Exhibitors.	Total Visitors.
Previously reported		7,558,709	1,689.709	9,248,478
Nov. 7	156th Day	76,053	11,806	87.859
" 8	157th "	90,588	12,539	103,127
" 9	158th "	176,924	16,154	193,078
" 10	159th "	106,367	15,354	121,721
" 11	160th "	15,396	12,201	27,597
" 13	161st "	7,777	11,208	18,985
Totals		8,031,874	1,768,971	9,800,845

MINING NOTES.

LEAD PRODUCT OF MISSOURI FOR 1876.—We note the statement that the yield of the lead mines of Missouri, for the year 1876, will probably exceed 18,000 tons.

COLORADO.—*Clear Creek Company Reduction Works.* The importance of the results this company has attained in treating low-grade ores, both by concentration and the extraction of silver, is scarcely realized by our citizens. The products which carry a high percentage of zinc and from 20 to 50 oz. silver, have hitherto been practically worthless. Smelters dislike to buy such mineral at any price, on account of its refractory nature, and as yet no means has been provided for utilizing this as a zinc ore. At this time, however, these reduction works are running on 20 to 30 oz. zinc ore, saving upward of 80 per cent., and making a fair profit over and above all expenses. Chlorination tests as high as 93 per cent. has been obtained, and the leaching operations show equally as good results. The first brick from these works was melted Wednesday. It weighs 831 oz., is 900 fine, and its coin value is $871.31. It was produced at a profit from 25 oz. ore, which carries over 50 per cent. zinc.

Boston and Colorado Smelting Company,—The shipments of this company for the month of October have been as follows: Silver, $113,000; gold, $101,000; copper, $12.000; total, $226,000.

Judd and Crosby Reduction Works.—The shipments of silver bars of these works for the week ending the 3d inst., through the First National Bank of Georgetown, amounted to $7,808.81. The above amount will probably fairly represent the weekly average shipments of these works through the season.—*Georgetown Miner.*

THE PRODUCTION OF THE UTAH MINES for the month of September, 1876, is as follows:

Lead and silver ores	18,924,031 lbs.
Copper ores	198,624 "
Iron	1,250,000 "
Salt	300,000 "
Coal	1,500.000 "
The shipments for the same month were:	
High grade silver ores	2,224,479 lbs.
Copper ores	132,323 "
Copper matte	12,391 "
Salt	172,940 "
Base bullion	3,674,888 "
Silver bullion	70,645 "

—*Mining Review.*

NEW MEXICO GOLD AND SILVER PRODUCT.—According to figures obtained at the Executive Department, the following was the mining product of New Mexico for the year ending June 30, 1876:

County.	Gold.	Silver.	Total.
Grant	$ 50.361 36	$422,829 45	$473,190 81
Colfax	212,500 00	....	212,500 00
Balance of Territory	20,000 00	2,500 00	22,500 00
Total	$282.861 36	$425,329 45	$708,190 81

This is a showing of $200,000 better than that of 1874. There is to be added to the mining product above stated 208,000 pounds of copper, chiefly from the Santa Rita mines, the only copper produced in the Rocky Mountains.

WYOMING.—*The Newcastle Coal Company.*—We entered the tunnel of this mine 3,025 feet when it intersected tunnel No. 2, we then proceeded on foot 1,975 feet further in to the face of No. 2. The coal lies at an angle of 38° pitching to the north. The tunnels run east where they are entered, and cut through the vein some 500 feet below the surface. From the mouth some 350 feet along the tunnel, the roof is supported by columns selected from the forest. After passing this, we come down to the pillars of coal 30 feet square, left as supports; then we pass along one chute 7 feet wide, down which the coal passes into the cars. Then another coal column 30 feet square, then a chute, etc., etc. There is over five feet of solid coal here. Coming to No. 2 tunnel we found the roof some 15 feet high and the tunnel 16 feet wide. Here the two veins come together and are 12 feet thick, showing a fine solid bright coal. From the mouth of the tunnel runs a trestle work some 600 feet long, from 8 to 50 feet high and 18 feet wide, on which are two tracks, one a down grade for the loaded train to the dump, and the other a down grade for the empty cars going back to the tunnel. The Bunkers are 60 feet wide and 90 feet long, with a capacity of 1,200 tons. The coal after being picked passes over four screens 26 feet long and five feet wide, three-quarters of an inch between the bars. Then down it goes and is again screened by finer bars, only three-eighths of an inch wide, saving two kinds, coarse and nut coal, each passing into separate bunkers. The refuse passes off into small bunkers and is consigned to the dump. The trestle work and bunkers are built in the most substantial manner of the excellent wood of this locality. There are still remaining in tunnel No. 1 about 6 000 tons of coal yet to be taken out. No. 1 intersects No. 2 at 3,025 feet from the mouth of the tunnel. No. 4 is on 538 feet, with 125 feet of back at the face. In addition to the above there is one vein not yet opened, but which has been prospected in cross sections, showing a vein of 17 feet thick, which bids fair to be the best yet struck, though small seams of slate appear here and there. There are five feet three inches of clean coal on the bottom strata. There is another vein seven feet thick discovered last Summer, in the center of which is a small "mining seam." This vein approaches very near the anthracite of Pennsylvania in color and hardness. No. 4 tunnel is in 558 feet. The vein is 4¼ to 5 feet thick. The coal resembles the Cumberland coal of England.—From correspondence in *San Francisco Journal of Commerce.*

NOVA SCOTIA COAL.—This important industry is still, we regret to state, declining instead of improving, and the results of the past nine months do not compare favorably with those for the same period last year. It is true that in one county the trade has received a marked impulse, but both in Pictou and in Cape Breton the falling off is but too pronounced. Last year, in the nine months ending the 30th September, Pictou sold 257,208 tons of coal; during the same period this year the sales amounted to 196,020 tons, showing a falling off of 61,188 tons. Cape Breton which, during the first three-quarters of 1875 sold 220,336 tons, sold this year 26,699 tons less—193,637 tons. In Cumberland the increase, as we have said, was marked, the sales being—first three-quarters of 1875—40,080 tons; same period this year, 58,202 tons; increase in 1876, 18,122 tons. From other counties the sales last year amounted to 2,739 tons, and this year to 3,764 tons, showing an increase of 1,025 tons. The following table shows the coal trade by counties for the nine months ending 30th September, 1876:

	Tons raised.	Tons sold.		Tons raised.	Tons sold
Cumberland	66,517	58,202			
Pictou	228,508	196,020	Other counties	4,299	3,764
Cape Breton	232,911	193,637	Total for the province	533.235	451,623

A comparison with the table given in the Inspector of Mines' Report for 1875, shows that the Cumberland sales this year, while smaller during the first quarter, were larger the second, and in the third exceeded last year's sales by over 11,000 tons. In Pictou, on the contrary, the first quarter's sales this year exceeded last, but in the following two quarters they show a considerable decrease, and the same is the case with Cape Breton. The following table shows the total sales up to September 30th, 1876:

	Tons.		Tons.
Nova Scotia	143.508	East Indies	
Quebec	101,754	West "	6,538
New Brunswick	71 397	South America	
Newfoundland	33,698	Europe	549
P. E. Island	34,369		
United States	59,810	Total	451 623

The sales during the same period in 1875 amounted to 521,363 tons—there was, therefore, a decrease this year of 67,740 tons. This serious reduction took place during the last three months—the busiest portion of the shipping season—and was chiefly experienced in the Pictou District, the trade with the Province of Quebec having decreased no less than 63,321 tons. The home consumption shows a falling off of 5,811 tons. The exports to the United States mark a continued decline in the demand for provincial coal—with a protective duty of seventy-five cents in gold in the current year of 5,171 tons. The Newfoundland trade was affected by the strike at Sydney Mines to the extent of 8,879 tons A small increase—869 tons - in the shipments to the West Indies is returned, and a further slight extension of the trade with Prince Edward Island to the amount of 2,461 tons is noticeable. The opening of the Inter-colonial Railroad has materially aided the Spring Hill mines and the trade with the sister Province of New Brunswick, 14,113 tons having been shipped during the present season over the quantity shipped up to the same time last year.—*Halifax Morning Chronicle,* Nov. 8.

FIRE IN THE WELLINGTON COAL MINE, NANAIMO, BRITISH COLUMBIA.—We condense the following from our Northern contemporary the *British Colonist:* On the 14th October this mine caught fire, it is said, from a ventilating furnace, and as this is a very common cause, the report is probably correct. The slope caught fire, and from all accounts the conflagration was soon beyond control. The walling-in of the part on fire was promptly decided on and energetically executed. When this was done, on the 17th of October, steam was injected from boilers on the surface, and recent reports from the mine state that the fire has been completely extinguished. This is another example of the success of steam as an extinguisher for mine fires. It is expected that work will be resumed at the mine in four or five weeks.

THE RED ROCK COAL MINE is located in Slack's Canyon, Monterey County, California. The *San Benito Advance* says: "The tunnel of this mine penetrates the hill side about 30 feet. This tunnel is eight feet high and six feet wide, and nothing above or below or on the sides is visible but the black diamond. The district is easy of access, and a road can be constructed at a trifling expense to connect with the railroad depot at Los Gatos, the point to which the Southern Pacific railroad company is now extending the line from Goshen. The mine and depot are twelve miles apart. Several tons of coal have already been hauled from the mine to Tulare lake, where it has been used satisfactorily for steamboat purposes." Of course the local press sees "millions in it."

THE JONES GOLD MINE COMPANY, operating in North Carolina, composed largely of men from Niles, has struck a new vein in which gold is found in large abundance. One lump of ore, weighing about three pounds, and said to be worth $70c, was recently found in the mine.

COAL DISCOVERY IN NEW BRUNSWICK.—A new coal mine has been discovered on the New Brunswick side of the Bay of Funday, twenty-six miles from St. John. For years this deposit has been known to exist, but it is only recently that anything has been done toward working the mine.

GOLDEN, COLORADO, COAL PRODUCT.—The coal banks in and around Golden have sold 2,600 tons of coal in the past four months.

COLORADO COKE.—El Moro is rejoicing that the demand for coke has induced the Denver and Rio Grande railway to commence the building of a dozen new coke ovens in that district.

NOTES.

THE YOUNGSTOWN (OHIO) ROLLING MILL is running full double turn, and employs 225 men.

THE HIMROD FURNACES, near Youngstown, Ohio, are both in blast, one making Bessemer pig, the other forge iron.

THE UNION PACIFIC RAILROAD COMPANY has decided to add a rolling mill for making bar iron to its rail mill at Laramie, Wyoming.

THE CLEVELAND (OHIO) IRON WORKS are running full time on rails and merchant bar. The company's blast furnace is making 50 tons of pig iron per day.

NEW ZEALAND GOLD EXPORTS.—For the quarter ending the 31st of March, 1876, there were exported from the Colony of New Zealand 89,954 ounces of gold, valued at $1,785 275.

GERMAN NICKEL COINAGE.—The nickel coins struck in Germany under the new Law represent a total value of between $10,000,000 and $11,000,000. This is the maximum figure allowed, and minting has been suspended.

CENTENNIAL EXHIBITION.—There were 30,880 exhibitors in the international Centennial Exposition, of which 8,175 are from the United States. Spain with her colonies, comes next with 3,822, and Portugal third, 2,462; Turkey, 1,632; France, 1,597; Argentine Republic, 1,397; Canada, 1,347; Italy, 1,444; Germany, 1,099; and Great Britain, 1,004.

BELL-METAL.—A new alloy for bell-metal is proposed, which does not tarnish, is less likely to crack, gives a better sound, and is much lighter in weight than the alloy usually employed for the purpose. It is prepared as follows: Nickel, 1 lb., and copper 6 lb., are melted and cooled. Add zinc 1 lb., aluminium ½ oz. Melt and cool. Melt again, and finally add ½ oz. quicksilver and 6 lb. melted copper.

ARTIFICIAL DIAMONDS.—Many pastes have been devised for the preparation of these beautiful stones. None have been able in their products to equal the natural diamond in hardness and brilliancy; but nevertheless, to an unpracticed eye, the imitation is so perfect that the difference cannot be distinguished. The following formula for making a diamond paste is said to be one that gives the most satisfactory result. It is called "Loysel's" waste:

Take pure silica	100 parts
Red oxide of lead	150 "
Potash, calcined	30 "
Borax, calcined	10 "
Arsenious acid	1 "

This produces a paste which has great brilliancy and refractive and dispersive powers, and also a specific gravity similar to that of the oriental diamond. It fuses at a moderate heat, and acquires the greatest brilliancy when re-melted and kept for two or three days in a fused state, in order to expel the superabundant alkali and perfect the refining. This paste is used not only to produce factitious diamonds, but, besides other factitious gems, of which it forms the basis.—*Druggists' Circular.*

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending Nov. 11.

Tons of 2,240 lb.	1876. Week.	1876. Year.*	1875. Week.	1875. Year.*
Wyoming Region.				
D. and H. Canal Co.	59,484	1,703,062	64,792	2,655,057
D. L. and W. RR. Co.	65,112	1,585,849	57,703	2,638,094
Penn. Coal Co	32,351	926,215	26,071	1,191,570
L. V. RR. Co	14,574	812,864	21,323	817,871
P. and N. Y. RR. Co.	873	20,541	660	83,593
C. RR. of N. J.	40,092	1,141,392	50,570	1,238,488
Penn. Canal	15,318	377,430	11,691	277,106
	227,804	6,567,353	232,870	8,902,379
Lehigh Region.				
L. V. RR. Co	96,926	2,377,225	86,079	3,827,937
C. RR. of N. J.	32,448	1,119,577	37,259	652,307
D. H. and W. B. RR.	1,239	37,940	1,994	73,506
	130,613	3,605,742	125,632	2,553,750
Schuylkill Region.				
P. and R. R. RR. Co.	153 738	4,154,424	179,703	4,082,462
Shamokin & Lykens Va.	26,094	808,867	28,389	1,079,973
	179,832	4,963,291	208,092	5,162,435
Sullivan Region.				
Sul. and Erie RR. Co.	396	29,094	893	9,030
Total	538,645	15,165,480	567,487	16,627,594
Increase	—	—	—	—
Decrease	28,842	1,462,114	—	—

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 464,477 tons, as compared with the corresponding period in 1875.

Belvidere Delaware RR. report.	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	11,849	251,765	167,833
" " " South Amboy	11,299	377,833	222,601
Shipments at Coal Port (Trenton)	9,774	254,737	164,089
" South Amboy	11,886	429,647	235,067

Perth Amboy business :

	Tons.
Received for the week	23,614
Shipped for the week	23,509
On hand Nov. 11	34,382

Receipts of Coal at Boston, for the week ending Nov. 10, and years from Sept. 1, 1875 and 1876.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	—	10,597	34,583
Philadelphia	14,834	186,451	227,544
Baltimore	760	35,862	40,416
Other places	5,534	70,638	92,649
Great Britain	200	1,064	704
Nova Scotia	261	10 915	10,554

Coal Shipped at Pictou, N. S., for week ending Nov.

4 1876 ..... 3,714 tons.
Previously exported, since Jan. 1 ..... 155,994 "

Total to date 159,708

The Production of Bituminous Coal for the week ending Nov. 11, was as follows :

Tons of 2,000 lb., except where otherwise designated.

Cumberland Region, Md.	Week, Tons.	Year, Tons.
Tons of 2,240 lb	43,326	1,781,736
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	9,072	298,726
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	3,939	135,975
*East Broad Top	1,522	57,096
Clearfield Region, Pa.		
*Snow Shoe	851	42,983
*Tyrone and Clearfield	25,207	963,229
Allegheny Region, Pa.		
*Pennsylvania RR	4,307	171,962
Pittsburgh Region, Pa.		
*West Penn. RR	4,418	168,211
*Southwest Penn. RR	1,403	48,171
*Penn. & Westmoreland gas coal, Pa. RR.	22,349	705,640
*Pennsylvania RR	6,999	255,319

* For the week ending Oct. 28.

The Production of Coke for the week ending Oct. 28.

Tons of 2000 lb.	Week.	Year.
West Penn. RR	2,832	41,902
Southwest Penn. RR	9,400	431,400
Penn. & Westmoreland Region, Penn. RR.	1,914	46,590
Pittsburgh, Penn. RR	2,986	131,737
Total	17,192	651,629

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, Nov. 17, 1876.

Anthracite.

OUR anticipations have been fully realized—the middle of November finds the demand for coal almost exhausted, with very discouraging prospects for the balance of the Winter. Great concessions in prices are currently reported and still greater ones are anticipated. The Pennsylvania Coal Company will offer at auction on the 21st inst., 100,000 tons of coal, and the Delaware, Lackawanna and Western Railroad a like quantity on the following day. The general expression of belief is that lower prices will prevail at these, than at the last sales of the same companies. The Delaware and Hudson Canal Company will not offer any coal at auction this month, and it is doubtful if it will during the Winter. For ready reference we give the prices realized at auction by the Delaware, Lackawanna and Western Railroad Company, and the Pennsylvania Coal Company at previous sales this year :

DELAWARE, LACKAWANNA AND WESTERN RAILROAD.

	Aug 29.	Sept. 27.	Oct. 25.
Steamer	$2.74¾	$2.90½	$2.96½
Grate	2.70¼	2.97½	2.82¼
Egg	2.77	3.18¼	2.92½
Stove	3.60¼	3.96½	3.85
Chestnut	2.73¼	3.28	3.81¼

PENNSYLVANIA COAL COMPANY.

	Aug. 29.	Sept. 20.	Oct. 20.
Lump	$2.50	$2.92	$2.92½
Steamer	2.72½	2.93	2.95
Grate	2.68½	2 92	2.94
Egg	2.87½	3.12	3 10
Stove	3.63¾	3.64	3.86
Chestnut	3.26¼	3.20	3 76

It will be observed that if much of a reduction takes place at the next sales the prices to be realized will be, on nearly all sizes, no better than those of the sale of August 29, which, it was thought, by the majority of dealers, would be the lowest prices that would be seen. The abandonment of the auction system by the Delaware and Hudson Canal Company will, certainly, be a great help to the general trade, as every additional ton of any article forced upon a depressed and falling market must only tend to increase that depression.

Although the demand has fallen off, yet the production of coal continues to be at the rate of fully 27,500,000 tons per annum. This large production, in the absence of demand, is not a new feature for this season of the year. The managers, in their efforts to make as large a show of business as possible in closing their accounts for the year, either to continue in favor with their stockholders or to strengthen the credit of their companies, are tempted, not only to put themselves in a position (this year in particular) that they will be unable to declare dividends, even though they shall have earned them, but at the same time to so thoroughly overstock the market as to make, at least, the first quarter of 1877 a very unprofitable one. There is every indication that at the opening of the new year either the men or the companies will have to strike, as production must cease for awhile.

Bituminous.

The Clearfield production is well maintained, and the companies are well supplied with orders for the present. In the Cumberland region the shipments last week fell behind those of the corresponding week of 1875 nearly 6,000 tons. Several of the companies are about to stop shipments by canal, so that there are indications that the already large loss of trade will be made still greater by the end of the year—say, a total loss of 500,000 tons.

The Kanawha, W. Va., trade is assuming important proportions. Our Richmond correspondent notes that change in prices of Kanawha and New River coals is occasioned by the unlooked for demand and increasing popularity.

Coal Trade of Philadelphia.

PHILADELPHIA, Nov. 16, 1876.

From our Special Correspondent.

The trade is decidedly dull at all points, with no prospect of recuperation for the balance of this season except such short-lived improvements as may be expected for domestic sizes when a cold snap occurs.

Vessels are not so plenty, but still in excess of the demand, and, consequently, freights are weaker. Rates have now declined to $1.75 to Boston, and $1 50 to the Sound ; 75c.@80c. to Washington, 80c. to Norfolk, and $1 to Richmond.

Wholesale Prices of Anthracite Coal for Nov., f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Rondout	3 15	3 20	3 30	3 40	4 25	4 00
Pittston at Newburg	3 00	3 05	3 15	3 25	4 10	3 70
Wilkesbarre at Port Johnston	3 25	3 25	3 50	3 50	4 25	3 60
Plymouth, R. A.	....	....	3 50	3 50	4 30	3 60
Susque. Coal Co. at Amboy W.A.	3 25	3 25	3 50	3 50	4 15	3 60
Kingston at Hoboken	3 25	3 25	3 25	3 40	4 10	3 75
Lehigh Coals.						
Old Company at Port Johnston	4 00	....	3 60	3 60	4 00	3 60
Old Company's Room Run "	4 00	....	3 60	3 60	4 00	3 60
Sugar Loaf, Hobok. & Amb. "	4 00	....	3 60	3 60	4 00	3 60
Lehigh Coal Exchange "	4 00	....	3 60	3 60	4 00	3 60
Honey Brook Lehigh	4 00	....	3 60	3 60	4 00	3 60
Beaver Meadow at South Amboy	4 00	....	3 60	3 60	4 00	3 60
Schuylkill Coals at Philadelphia.						
Schuylkill white ash	3 20	3 20	3 20	3 20	3 70	3 45
Schuylkill red ash	....	....	....	3 30	3 80	3 20
Lorberry	....	....	4 20	4 20	4 20	3 25
Lykens Valley	....	....	4 70	4 70	4 70	3 70
North Franklin red ash	....	....	4 20	4 20	4 20	3 25

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

Per ton.

Freight from Hoboken and Weehawken to New York .... 45c.
" " Elizabethport & Port Johnston to N. York. 45c.
" " South Amboy to New York ..... 45c.

Freight by the boats of the companies from Hoboken, Port Johnston, Weehawken, Rondout, South Amboy and Perth Amboy to New York City and vicinity 50c.

Freight by the Pennsylvania Coal Company's boats from Newburg to New York 65c.

Lackawanna coal delivered to carts in New York or Brooklyn, 50 cents per ton additional.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$6 00
" " at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
Youghiogheny, Waverly Co., at Balt.	4 25	5 65
Despard, West Va.	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 85
Fairmount, West Va., " "	4 40	5 70
Newburgh Orrel, Md. " "	4 50	6 00
Cannelton Cannel, W. Va.	....	10 00
" Splint, " at Richmond.	5 50	7 00
" Gas Coal at Richmond.	4 15	5 65
Peytona Cannel W. Va at Richmond	....	10 00

Manufacturing and Steam Coals.

Cumberland at Georgetown and Alexandria, Va	3 50@3 75	5 25
Cumberland, at Baltimore	3 65@3 80	5 40
Clearfield f.o.b. Canton, Baltimore	3 40@3 65	5 25

Pennsylvania Semi-Bituminous Coals.

At the mines, per 2,000 lb., 50c. f.o.b. at Greenwich, Phila., for Eastern and Foreign shipments, per 2,240 lb. $3 25@340 for Sound ports, 3 50@3 65, through Delaware and Raritan Canal, for points on Hudson River. $3 80 f.o.b., at South Amboy, N.J., per 2,240 lb., $4 50@4 70. Discharged, in New York, per 2,240 lb., $5 00@5 25.

Foreign Gas Coals.

	Sterling.	Am. currency.
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@ 7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	42/	18 00
" Gas Cannel "	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S.	2 00	4 75
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 50	4 25
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$4 20	$4 50	$3 80
Lackawanna coal, in yard	4 20	4 50	3 80
Wilkes-Barre, delivered	5 00	5 30	4 60
Lehigh & Locust Mountain, del'd.	5 50	5 50	5 00
Schuylkill Red Ash, del'd	6 00	6 00	5 50

The Cost of delivery for Pittston and Lackawanna coal ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb.			$18 00
Liverpool House Cannel	"	"	.... 22 00
American	"	"	.... 13 00
Cannelton Block, or splint,	"	"	.... 10 00
American Orrel	"	"	....11@14
Red Bank Cannel	"	"	.... 10 00
Cumberland	"	"	.... 7 00

Baltimore, Md. Nov. 13, 1876.

Reported by our Special Correspondent.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Lee" or "Diamond," Pittston and Plymouth. White ash.	In cars at depot.	By boats afloat.
Lump and steamboat	$3 85	$3 55
Broken	3 85	3 55
Egg	3 85	3 55
Stove	4 35	4 05
Nut	3 85	3 55
Shamokin, (red or white ash), and "Boston," free burning white ash,		
Egg	4 10	3 80
Stove	4 35	4 05
Lykens Valley, red ash,		
Egg and stove	5 35	5 05

From wharf or yard, wholesale, 50@75c. additional.

By retail, all kinds and sizes, per 2240 lb. ..... $6 00@7 50

BITUMINOUS.

George's Creek, Cumberland f. o. b. at Locust Point	3 75@4 00
West Virginia Gas f. o. b. at Locust Point	4 50
Youghiogheny Gas, f. o. b. at Locust Point	4 50
Swanton	4 00

Boston. Nov. 11, 1876.

COAL has met with a check in the demand, based on the warmer, muggy weather and on the belief that resumptions of full operations at the mines and pressure of supplies will lead to lower prices next week. Freights are easier at $1 80@1 85 from Philadelphia, $2 00@2 25 from Alexandria and Georgetown.—*Commercial Bulletin.*

Buffalo, N. Y. Nov. 15, 1876.

Reported by LEE & LOOMIS.

Deliv'red at	Elmira. Afloat.	Ithaca. Afloat.	Syracuse Afloat.	Rochester. Afloat.	Rochester. ret. del.	Oswego f.o.b.
Grate	$4 20	$3 45	$3 60	$4 30	$5 55	$4 55
Egg	4 20	3 55	3 70	4 40	5 65	4 65
Stove	4 60	4 05	4 20	4 90	6 15	5 15
Nut	4 35	3 80	3 95	4 65	5 90	4 90

Delivered at	Erie. f.o.b.	Buffalo. Afloat.	Buffalo. f.o.b.	Buffalo. ret. del.
Grate	$5 05	$4 55	$5 05	$5 80
Egg	5 15	4 65	5 15	5 90
Stove	5 65	5 15	5 65	6 40
Nut	5 40	4 90	5 40	6 15

Chicago, Ill. Nov. 15, 1876.

Lackawanna Stove	$8 00
" Chestnut	8 00
" Grate and Egg	7 50
Erie and Brier Hill	6 00
Wilmington and Illinois	3 50@ 4 25
Blossburgh	7 00

Cincinnati, O. Nov. 13, 1876.

Reported by A. B. BUCHANAN & Co.

Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	@8c.	—
Pomeroy coal	@5c.	—
Kanawha "	7½c.	—
Ohio River Coal	5½c.	—
Cannel coal, according to quality	@16c.	—
The following are the retail prices delivered		
Youghiogheny	10c@11c.	—
Pomeroy	9c.	—
Cannel	@22c.	—
Kanawha	10c.	—
Anthracite, per ton		$9 00
Coke, at yard	10c.	—
Coke, hard and soft, delivered	— @9c.	—

Cleveland, O. Nov. 13, 1876.

Specially reported by Messrs. LAMBIE & BATES.

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

	1 to 10 tons	10 tons upw'd.
Lacka'a., Wilkesbarre and Pittston egg and grate,	7 00	6 75
" " " stove	7 50	7 25
" " " chestnut	7 25	7 00

Lehigh to be $1 25 per ton higher.

All sales to be strictly cash with order or C. O. D.

Indianapolis, Ind. Nov. 13, 1876.

Specially reported by Messrs. COBB & BRANHAM.

Wholesale on board cars, and retail delivered to consumers.

Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

White River, per ton	$2 50	Peytona cannel, per ton.	5 75
Brazil Block, "	2 50	Indiana Cannel	4 50
Highland, grate, "	2 25	Hocking Valley	4 25
Block coal, nut, per car	18 00	Youghiogheny	4 50
Highland " "	18 00	Blossburg (smithing)	6 50
Block Slack "	17 00	Piedmont "	6 50
		Gas coke, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken	$8 35	Nut	8 50
Egg	8 35	Stove	8 75

Lehigh Anthracite.

Broken	9 75	Nut	9 50
Egg	9 75	Stove	10 00

Retail, per bushel, delivered.

Sand Creek	15c.	Block Nut, steam	8
White River	13	" Slack, "	7
Brazil Block	14	Peytona Cannel	28
Highland grate	13	Virginia "	27
Block Nut, domestic use	12	Youghiogheny	20
Highland Nut, " "	12	Blossburg	26
" " steam	8	Piedmont	26

GAS COKE (measured.)

Crushed	15c.	Lump	12c.

ANTHRACITE.

Wilkes-Barre and Lackawanna (all sizes)	$9 75 per ton.
Lehigh, retail	$11 50 per ton.

Louisville, Ky. Nov. 13, 1876.

Specially reported by Messrs. BYRNE & SPEED.

Please report our prices as follows;

WHOLESALE.

per bushel		per bushel	
Pittsburg	6½c.	Pine Hill	—
Raymond City	6½c.	Kentucky	7c

RETAIL.

per bushel		per bushel	
Pittsburgh	10c.	Peytona Cannel	18c.
Raymond City	10c.	Buckeye "	
Pine Hill	13c.	City-made Coke	8c.
Kentucky	9c.	Auth., per ton, $10 00 to 10 50	
Screened Pittsburgh per load			$3 50
Screened Raymond City			2 50
Pine Hill (Kentucky)			2 25
Cannel			4 50
City-made Coke			4 00

Milwaukee, Wis. Nov. 13, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.

The coal trade is not as good as might be desired The reduction of prices east compel a decline here. The following are the prices with us for the present:

Retail price per ton of 2000 lb.

Lehigh Lump	$ 8 00	Briar Hill, select	$7 00
Lehigh Prepared	9 00	Blossburgh	7 00
Lackawanna (all sizes)	8 00	Cannel	6 00
Pittston	8 00	Pittsburgh	6 50
Scranton	8 00	Oak Hill	6 00
		Steam coal	4@5 00

New Orleans, La. Nov. 8, 1876.

Reported by C. A. MILTEBERGER & Co.

Pittsburg coal, wholesale, by boat-load, per bbl	27@28c.
" steamboats, per bbl	40c.
" to manufacturers	42½@45c.
" to families	45@50c.
" shipments, per hhd	$5 00
Anthracite, wholesale, per ton	8@8.50
" retail, "	12@13
Virginia Cannel, per bbl	80c.
Scotch " "	..c.
Mt. Carbon, wholesale, per bbl	...
" " retail, "	50c.
St. Bernard wholesale, per bbl	25c.
" steam boat	30c.
" retail, "	40@45c.

Pittston, Pa. Nov. 16, 1876.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb.

Retail.

Lump, Egg and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, fifty cents per ton additional.

Richmond, Va. Nov. 15, 1876.

Specially reported by S. H. HAWES, Dealer in Coal.

The change in price of Kanawha and New River coals is occasioned by the unlooked-for demand and increasing popularity. Quotations are as follows:

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous,	$4 40
Coalburgh Splint	5 70	Clover Hill Coal	3 50
Lewiston "	5 70	James River Bitum	3 30
Kanawha Gas coal	4 90	" " Carbonite,	5 00

San Francisco, Cal.

From the *Commercial Herald*, Nov. 9, 1876.

Imports from Jan. 1st to Oct. 31:

	tons.		tons.
Anthracite	10,671	Vancouver Island	83,013
Australian	122,223	Rocky Mountain	163
Coos Bay	31,942	Seattle	75,679
Cumberland	12,395	Bellingham Bay	19,135
English	80,771	Chili	3,150
Mt. Diablo 9 mos	86,408		

Imports continue upon a gigantic scale, causing continual depression in prices. Some cargoes of Scotch and English Steam, that were placed a few weeks since at the time of the closing of the Mt. Diablo mines at $7 70, or thereabouts, have, since the re-sumption of work therein, been offered on sale at 50c. less than cost. We note the following arrivals during the week: *Amie*, from Seattle, 940 tons Renton Co.; *Galatea*, 360 tons cannel; *Osmyn*, 810 tons Seattle; *Enoch Talbott*, 1,730 tons do.; *Empire*, 625 tons Coos Bay; *Berkshire*, 1,750 tons Scotch from Dundee, etc. The spot price of Cumberland ex ship, $14@15 in bulk, $17 in casks; Lehigh, $13 50@15; Pittston, $14@14.50 for egg; Sydney Steam, $7.50; Walsend, $8@8.25; West Hartley, $8.50@9; Mt. Diablo, fine, $5.75, coarse, $7.75; Coos Bay, $9; Seattle, $9; Bellingham Bay $8.

St. Louis. Nov. 11, 1876.

Reported by JAS. J. SYLVESTER, Secretary of the Anthracite Coal Association.

Retail prices, delivered.

ANTHRACITE.	per ton.
Lackawanna	$9 00@10 00
Wilkes-Barre	9 00@10 00
Schuylkill	9 00@10 00
Lehigh	10 00@10 50

BITUMINOUS.

Blossburg	9 00
Pittsburg	4 50
Indiana Block	4 00
Big Meadow	3 00
Illinois Coals	2 50@3 00
Connellsville Coke	2 50

Toledo, Ohio. Nov. 13, 1876.

Specially reported by GOSLINE & BARBOUR.

We quote as follows for retail delivery:

Lackawanna lump	$6 75	Lehigh lump	$7 75
" egg	6 75	" egg	7 75
" stove	7 00	" stove	8 00
" chestnut	6 75	" chestnut	7 75

Soft Coal.

Hocking lump	4 00	Brier Hill	5 75
" nut	4 00	Blossburg	8 00
Willow Bank lump	4 50	Cumberland	8 00
" " nut	4 00		

Montreal. Nov. 13, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Wholesale per ton of 2240 lb.

Scotch Steam	$4 25	Cape Breton Steam	$3 75
Pictou "	4 25	Newcastle Smiths	5 50

Anthracite at retail, per 2000 lb., delivered.

Egg	$6 25	Chestnut	6 25
Stove	6 75		

Hamilton, Ont. Nov. 13, 1876.

Specially reported by H. BABNARD, Dealer in Coal.

Grate	$5 75
Egg	5 75
Stove	6 00
Nut	5 75
Lehigh Lump	6 50
Smithing	6 00
Bituminous retail	5 50
" steam	4 00
Coke	6 75

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals. per ton of 2240 lb.	From Penn Haven.	From Mauch Chunk.	From Hazleton**	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J. (117 miles), via Central Railroad of New Jersey	1 62	1 48	2 04	1 95	2 18
‡ Mauch Chunk, Pa., via Central Railroad of N. J.	34	....	58	49	72
‡ Philipsburg, N. J., (46 miles)	60	46	1 00	91	1 14
Elizabethp't, (114 m) Pt. Johns., Hoboken & South Amboy, N. J., shipping and wharfage 35c. add.	1 26	1 12	1 68	1 59	1 82
High Bridge, N. J.	1 95	1 75	2 43	2 34	2 52
Elizabeth, Cranford, Westfield & Elizabethport, for consumption,	1 89	1 75	2 31	2 22	2 45
Jersey City, N. J., (121 miles) and New York, via L. V. RR	1 59	1 47	2 01	1 92	2 15

From *Mauch Chunk* to *New York* (121 miles), (towing limits) and Jersey City† via Lehigh Valley RR. $1 47

From *Mauch Chunk* to *Philadelphia* (93 m.) via L. V. and L. and S. RR. and North Penn. RR 1 25

For way points between *Mauch Chunk* and *Phillipsburg*, on the New Jersey Railroads 1 00

From *Phillipsburg, N. J.* to *Hoboken* (84 m.) for shipment via Delaware Lackawanna and Western RR., Morris and Essex Division 65

From *Phillipsburg, N. J.*, to *Newark* (75 m.) via Delaware, Lackawanna and Western RR. 1 01

** Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance.

Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

† Transportation on Coal destined for re-shipment from this point from boat to boat is 20c. less, if discharged upon the wharf 10c. less than the above rate.

The distances in the above table are Computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *upper Lehigh*, 33 miles. From *Hazleton* 24 miles, and from *Penn Haven* 8 miles.

From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 161 miles, and from *Mauch Chunk* it amounts to 106 miles.

Geneva, Ithaca and Sayre Railroad.—The rates of transportation on coal from Coxton, Pa., per ton of 2,240 lb., from and after the first of November, will be as follows:

To East Waverly, N. Y.	$1 75
" Ithaca, and for C. Lake RR. (local)	1 64
" " for C. Lake RR, and via Erie Canal (shipment)	1 56
" To Van Etten, for U. I. and E. RR	1 61
"Geneva (local) for S. P and S. and L. O. S. Railroads, and for N. Y. C. and H. R. RR, except Auburn and Cayuga	2 06
To Geneva, for Buffalo and Towanda	1 85
" " " Rochester and Charlotte	1 99
" " " Auburn and Cayuga	2 50
Total rate to Buffalo	3 07
" " " Rochester	2 75

REGULATIONS.

A charge of fifteen cents per ton will be collected of each consignee on all coal not unloaded within twenty-four hours after its arrival, and an additional charge of ten cents per ton for every twenty-four thereafter; Sundays and legal holidays excepted.

No allowance will be made for coal lost from cars on account of bro ken doors or o her defects existing when the cars are loaded.

All freights will be collected weekly, by drafts on shippers, from Coxton to destination.

Freights

Representing the latest actual charters up to Nov 17., 1876.

Per Ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	....	....	....	....
Albany	....	....	...	....
Alexandria	....	....	....	....
Amesbury, Mass	....	....	....	1 75
Bangor, Me	....	3 00	....	1 50
Bath, Me	....	2 25	2 30	1 50
Baltimore	....	....	....	....
Boston, Mass	1 75@1 90	2 25	2 25	1 40
Bridgeport, Ct	1 15†	1 90	1 80	80
Bristol, R. I	1 50	....	....	1 00
Cambridgeport, Mass.	1 80@2 00	....	....	1 50
Derby	....	....	....	....
Dighton	....	....	....	....
East Cambridge	1 80@2 00	....	....	1 50
Fall River	1 50	1 90	1 80	1 00
Hackensack	1 12†	....	....	....
Hallowell, Me	....	....	....	....
Hartford	1 75@2 00	2 50	....	1 35
Hoboken	†95	....	1 50	40
Hudson	1 10	....	....	....
Jersey City	†95	....	1 50	45
Lynn, Mass	....	....	....	†1 40
Middletown	1 75@2 00	....	....	1 15
Mystic	....	....	....	....
Newark	†96	....	....	....
New Bedford	1 60	1 90	1 80	1 00
Newburyport	1 75@2 00	2 40	2 30	1 60
New Haven	1 10†	1 90	1 80	80
New London	1 50	1 90	1 80	80
Newport	1 50	....	....	1 00
New York	†95	1 60	1 55	40
Norfolk	....	...	70	75
Norwalk	1 10†	....	....	80
Norwich	1 60	....	....	90
Pawtucket	1 75	....	....	†1 00
Philadelphia	....	....	....	....
Portland	2 00@2 15	2 25	* 2 30	1 35
Portsmouth, N. H.	1 80@2 00	2 40	2 40	1 60
Providence	1 50	1 90	1 80	1 00
Poughkeepsie, N. Y.	1 10†	....	....	....
Rockport	....	....	....	....
Saco	....	....	....	....
Sag Harbor	....	....	....	....
Salem, Mass	2 00	2 25	....	1 40
Salisbury Pt., Mass	....	....	....	....
Stamford	1 10†	....	....	....
Stonington	....	....	....	....
Taunton	....	....	....	....
Troy	1 15†	....	....	....
Warren, R. I	....	....	....	1 00
Wareham	....	1 90	1 90	....
Washington	....	....	....	....
Weymouth	....	....	....	....
Wilmington, Del	....	....	....	....

* And discharging and towing. † And discharging. ‡ And towing. § 30. per bridge extra.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Nov. 17, 1876.

American Pig.—The business done during the week has been only in a small way, upon the basis of $21 for No. 1 foundry. There is no marked change in the condition of the market. If anything, there is a slightly weaker feeling. We quote No. 1 foundry at $21@$22; No. 2, $19@$20; and forge, $19.

Scotch Pig.—Higher prices have been asked for this article owing to the advance in Glasgow, but in the face

of increasing stocks, and the indications of war, they are not likely to be maintained. The business doing is only in a small way, with Coltness quoted at $29; Eglinton, $26.50; and Glengarnock, $27.75.

MESSRS. JOHN E. SWAN & BROTHERS, of Glasgow, under date of Nov. 3, 1876, report 118 furnaces in blast as against 116 a year previous; 96,125 tons of pig iron in CONNAL & Co.'s stores, an increase of 951 tons during the week; shipments for the week ending October 28, 13,580 tons as against 11,366 tons for the corresponding week of 1875; decrease in shipments since Dec. 25, 1875, as compared with the like period of 1874-5, 68,320 tons: quotations of No. 1 iron as follows:—Gartsherrie, 65/; Coltness, 69/; Summerlee 63/6; Langloan, 66/; Glengarnock, 63/6; and Eglington, 57/6. They quote freights as follows: To New York, 2/; Boston, 9/; New Orleans, 5/; Baltimore, 8/; Philadelphia, 7/6; and San Francisco, 22/6.

Rails.—Late sales of 8,000 tons of steel rails by the Cambria Iron Company, and 8,000 tons by the Pennsylvania Steel Works, are reported to have been made to the Pennsylvania Railroad, at $49 at the mills. The quotations at mills range from $50@$52. The movement to form the equivalent of a combination among the makers of Bessemer steel appears to have either fallen through, or made but little headway. Iron rails are very quiet and quoted at $36@$40 at mills.

Old Rails.—These are without business and nominally quoted at $20.

Scrap.—Sales of No. 1 wrought scrap aggregating 600 tons are reported to have been made at prices ranging from $26.50@$25, the last sales at $25.50.

Philadelphia Iron Trade.

Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE, COX, JR., & Co., Iron Merchants, 333 Walnut Street, Philadelphia. Week ending Nov. 16, 1876.

PIG IRON.—The market remains as at our last, dull and depressed. The unsteady feeling manifested for some weeks, continues, and some sales have been made at prices not much smaller, but thought to be fully one to two dollars under quoted prices, while some of the older and larger companies hold firm to quotations, and amounts are sold up to the first of the year at full prices. A little firmness on the part of producers, it is thought, will hold present prices, while any weakness, or desire to cut prices, will bring about a fall lower than anything we have had yet. We report sales of about 2,000 tons in scattering lots, at quotations. We quote: No. 1, $21@$22.50; No. 2, $19.50@$20.50; Grey Forge, $19@$19.50; favored brands of Forge, $21.

MANUFACTURED IRON—Business is with pig—is very quiet, and there is no improvement to note. No change as to prices, as any further reduction would close up every mill in the East.

BARS are quoted at 2·25c.@2·30c. per lb.; skelp, 2¼c. @2·65c. per lb.; tank, 2⅞c.@7c. per lb., as to quality. Muck bars, $36@$39.

RAILS.—The market is dull, and no business transpiring, so far as we can learn. Iron rails are quoted at $38 @$40, at mill; steel, $52@$54, at mill.

OLD RAILS are also dull of sale, at $21.50@$22.

SCRAP, as with all branches of the iron trade at this time, is dull of sale. We quote: Wrought, $24@$27.; cast, $14@$19.

Baltimore. Nov. 15, 1876.

Specially reported by Messrs. R. C. HOFFMAN & Co.

The pig iron market continues extremely dull, with small sales at about quotations.

Baltimore Charcoal	$30@34	Anthracite No. 3	$20@21 00
Virginia Charcoal	28@33	Mottled and White	17@19 00
Anthracite No. 1	23@24	Charcoal C. B. Blooms	60@65 00
" No. 2	21@22	Refined Blooms	00@00 00

Boston. Nov. 11, 1876.

PIG continues to droop. Cutting on prices, though not quite so prevalent as it is said to be in New York and Philadelphia, gives the market a very dull aspect. The foundrymen, large and small, seem to think that lower prices are inevitable, and will not purchase except to supply their immediate wants. A few holders are still confident in their views. The large stock of pig held by the Reading Railroad Company continues to hang over the market and depress prices. Several more blast furnaces are also said to be preparing to blow in. We quote all the way from $20@25, with the tendency downward. Scotch continues in small supply and smaller demand, and we quote Gartsherrie $31 and Eglington $29 currency.

BAR is quite at unchanged price—$49 for refined and $40 for common. The demand for nails has slackened. —*Commercial Bulletin.*

Chattanooga, Tenn. Nov. 13, 1876.

Specially reported by J. F. JAMES. pig iron broker, etc, 233 Market Street.

The market here remains in the same unsettled condition as last reported. Demand for all grades of mill and foundry quite active, with very light stocks here and at the furnaces adjacent. I have to report sales of 500 tons gray mills, and 250 tons of No. 2 foundry hot blast charcoal, from furnaces below. The demand for foundry for the South-west and South is good, and shipments aggregating 150 tons during the past few days have been made to those districts. Prices remain unchanged.

Tenn. Ala. and Ga. Charcoal,	No. 1 foundry	$20@	21
" " " "	No. 2 foundry	19@	20
" " " "	gray forge	16@	17
" and Georgia coke,	No. 1 foundry	18@	19
" " "	No. 2 foundry	17@	18
" " "	gray forge	15@	16
White and Mottled		14@	15
Tennessee and Georgia cold-blast car wheel		21@	22
Alabama " "		21@	22
Old Rails	cash	20	50
Cast Scrap	"	13	
Wrought Scrap	"	18@	—

Cincinnati. Nov. 14, 1876.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

We have no change to report in our pig iron market. The demand has been only fair during the past week, and prices are about the same. We quote:

CHARCOAL.

Hanging Rock, No. 1 Foundry	$24 00@25 00	—4 mos	
" No 2, "	@23 00	—4 mos	
" Mill	21 00@22 00	—4 mos	
Tennessee, No. 1, Foundry	23 00@24 00	—4 mos	
Tennessee, No. 2, "	22 00@23 00	—4 mos	
" Mill	21 00@	—4 mos	
Missouri, No. 1, Foundry	@	—4 mos	

STONE COAL.

Ohio, No. 1, Foundry	22 50@	—4 mos	
" No. 2, "	21 00@22 00	—4 mos	
Ohio Mill	23 00@	—4 mos	
Missouri, No. 1 Foundry	25 00@	—4 mos	
" No. 2, "	24 00@	—4 mos	
" Mill	23 00@	—4 mos	

CAR-WHEEL.

Hanging Rock, C. B	40 00@45 00	—4 mos	
Tennessee "	25 00@32 00	—4 mos	
Missouri "	30 00@33 00	—4 mos	
Alabama "	25 00@32 00	—4 mos	

BLOOMS.

Charcoal	60 00@ 75 00	—cash

SCRAP IRON.

Cast	50c.@ 85	—cash
Wrought	1 00@1 40	—cash

Cleveland, Ohio. Nov. 13, 1876.

Messrs. C. E. BINGHAM & Co., quote as follows:

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	27 00@	
No. 2, " "	26 00@	
No. 1, Anthracite	24 50@	
No. 2, "	22 50@	
No. 1, Bituminous	24 50@	
No. 2, "	22 50@	
American Scotch, No. 1, Cherry Valley	@	
" " B—1, " "	@	
" " No. 2, " "	@	
No. 1, Massillon	25 00@	
B—1, "	24 00@	
No. 2, "	21 00@	

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	27 00@	
No. 4 " " "	27 50@	
Nos. 5 and 6 "	27 00@	

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	26 50@	

FORGE IRON.

No. 1, Gray	22 00@	
White and Mottled	20 50@	

Louisville. Nov. 13, 1876.

Specially reported by Messrs. GEORGE H. HULL & Co.

Our market remains firm since last report, with a good demand for mill and choice foundry grades, in hot blast, while the inquiry for car wheel irons shows a steadily increasing demand for fair to choice brands, at full figures.

The usual time, four months, allowed on quotations below.

HOT BLAST—CHARCOAL.

No. 1 Foundry, from Hanging Rock Ores	$24 00@25 00	
No. 2 " " "	22 00@23 00	
No. 1, Mill, from " "	20 00@21 00	
No. 1, Foundry, from Alabama, Georgia and Tennessee ores	22 00@23 00	
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	21 00@22 00	
No. 1, Mill, from " " " " "	20 00@21 00	

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	22 00@23 00	
No. 2, " " " " "	20 00@21 00	
No. 1, Mill, " " " " "	20 00@21 00	
No. 1, Foundry, from Ala. Ga. and Tenn. Ores.	21 00@22 00	
No. 2, " " " " "	20 00@21 00	
No. 1, Mill, " " " " "	20 00@21 00	
No. 1 Foundry, from Missouri Ores	— @ —	
No. 2 " " " "	— @ —	
No. 1 Mill, from Missouri Ores	23 00@25 00	

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	35 00@43 00	
" " Tennessee "	26 00@28 00	
" " Alabama and Georgia Ores	28 00@40 00	
" " Kentucky Ores	28 00@42 00	

Milwaukee, Wis. Nov. 15, 1876.

Specially reported by Messrs. R. P ELMORE & Co.

Iron trade but medium; sales a little improved.

Lake Superior No. 1 Charcoal	$26 00
" " " 2 "	25 00
Lake Superior No. 1 Anthracite	25 00
" " " 2 "	24 00

Pittsburg, Pa. Nov. 14, 1876.

Specially reported by A. H. CHILDS.

The market is extremely dull, with a slight decline in price on most of the forge iron offered. Only the best make of strictly red hot iron can still command the figures ruling for some time past. Foundry metal is unchanged. Quotations are:

No. 1 Foundry	24 00@25—4 mos	
" 2 "	22 50@23 00	"
Gray Forge	20 50@22 00	"
White and Mottled	18 00@20	"
Warm blast Charcoal	23 00@28	"
Cold blast Charcoal Western	40 00@15	"

Richmond, Va. Nov. 13, 1876.

Reported by ASA SNYDER, Esq.

Election times continue to suspend transactions in iron as in other departments of trade. There is a small business doing at quotations.

Virginia Cold Blast Charcoal Pig Iron		$27 to	$33
" Warm " " "		24 to	28
" " " Coke " "	1 X	23 to	24
" " " " "	2 X	21 to	22
" " " " "	3	20 to	21
" Anthracite	1 X	— to	—
" "	2 X	— to	—
" "	3	— to	—

San Francisco, Cal.

From the *Commercial Herald*, Nov. 9, 1876.

The ship *Galatea*, from London, brought us 416 tons pig iron, 500 boxes tin plate, etc. There has recently been quite an improvement in the demand for pig iron, resulting in sales of 500 tons Eglinton, to arrive, at $29 @29.50. The spot price of Glengarnock is $30@31. We note sales of 120 tons Sydney pig tin at 17½c. The *Sunrise*, for New York, carried 340,000 lb. pig lead.

St. Louis. Nov. 14, 1876.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

We beg leave to inclose our last revised price list of pig iron. There continues to be a good demand for both foundry and mill iron, though the latter is very scarce. Inquiries for future delivery are coming in fast, but few furnaces, however, are disposed to contract ahead. We quote on 4 months time for approved paper, with liberal discount for cash.

CHARCOAL.

Missouri No. 1 Found'y.	$23@25
" " 2 "	22@23
" Gray Mill	22@23
H. Rock No. 1 Found'y.	25@26
" " " 2 "	23½@24
" " Gray Mill	23@24
Tenn. No. 1 Foundry	23½@24
" " 2 "	22½@23
" Gray Mill	22½@23

COKE.

Alice H. R. Ex No 1 F'y.	26 00
" 1 "	25 00
B, " 1 "	24 50
" 2 "	23 50
Forge	23 50
Chat., Tenn. No. 1 Fd'y.	25 00
" " 2 "	23 50
" " Forge	22 50
" " White Mtl'd	21 00

STONE COAL.

Missouri No. 1 Fd'ry.	25@26
" " 2 "	23@24
" Gray Mill	22@23
" White & Mt'd	21@22

COLD BLACK CHARCOAL.

All Numbers.

Hanging Rock	35@46
Tennessee	30@33
Kentucky	30@33
Missouri	28@30
Georgia	28@30
Alabama	28@30
Assorted Bar Iron $2 25, rates.	
No. 1 Wrought Scrap 95c. cwt.	
Heavy cast " 70 "	
Light " " 40 "	

Montreal. Nov. 7, 1876.

PIG Iron is now held in a few hands and being sold at our advanced quotations in fair lots, and altogether the stocks held are small. We continue to quote Eglinton and Clyde; $19.25@$19.75; Summerlee $20.25@20·75; Langloan & Gartsheseile $20.50@23; Calder $22.@23.25; Hematite $26.@27. Bar, per 100 lbs., Scotch and Staffordshire $2.@2,05; best do, $2.25@2.80, Sweeds and Norway 4.76@$5; Lowmoor and Bowling, $6.@6.50.—*Monetary Times.*

THE SALT LAKE CITY SILVER ORE MARKET.

MR. J. B. MEADER, under date of the 11th inst., reports no change in the silver and copper ore market, as compared with the rates given in our last issue.

METALS.

NEW YORK, FRIDAY EVENING, Nov. 17, 1876.

THERE are but few features to the market. Some articles show a little better business while the indications of war have weakened foreign prices. The probabilities of a demand to come during the balance of the year are not encouraging.

Gold Coin.—During the week under review gold has ranged from 109¼ to 109⅞, and closed at 109⅞.

Bullion.—The prices of silver show but little change, the quotation in London is very strong at 54d.; in this city, 117; and in San Francisco, 11 per cent. discount. Gold bars are unchanged at par to ¼ per cent. premium.

Copper.—There are sales aggregating about 400,000 lb. reported to have taken place at 20c.@20⅛c. The market closes with the latter figure asked, and 20¼c. bid. In addition to the above-mentioned business, it is reported that about 400,000 lb. were sold for export last week. The London quotations of the 11th inst. were £86 for Best Selected, and £78 10/ for Chili bars. There is but a small demand in this market, with but very little offering.

Tin.—During the week the prices of Straits in London reached £79 10/, although to-day's quotation is £77. A business of several thousand slabs is reported in this market, although particulars are kept private. We quote Straits, 17¾c.@18c.; L. & F., 17⅛c.@17¾c.; Refined, 18c.; and Banca, 20c.

Tin Plates.—We note a sale of 2,000 boxes of coke tins on private terms. There is no change in prices, although they are firmer. The following are the quotations, in gold, per box: Charcoal tins, $6.75@$7, and ternes, $6.25@$6.50; coke tins, $6@$6.12, and ternes, $5.50@$5.75.

MESSRS ROBT. CROOKS & Co., of Liverpool, under date of Nov. 2, say of Tin Plates:—"A fair number of Coke Tin orders have been placed this month at the concessions offered by makers, but in other descriptions there has been an almost total absence of trade. Those manufacturers whose make is confined to Charcoals, are feeling this stagnation especially keenly, and the prices, some of them are prepared to take are accordingly very low. For deliveries ahead, though higher figures are

named, to-day's quotations with a little pressure could be worked."

Lead.—There has been but little business reported during the week, although a large sale is momentarily expected. The quotations range from 6@6·05c. with a weakening tendency, the result of large arrivals due during the next month, and the continued large weekly shipments to this port, from San Francisco.

Spelter and Zinc.—This article is quiet and quoted at 6¼c.@6¾c. Sheet zinc is quoted at 8¾c. for domestic.

Antimony is quiet and quoted at 14c., gold.

Quicksilver has advanced to 60c. per lb. in San Francisco, and £9 in per flask in London. There has been no business in this market to establish a price.

The San Francisco *Commercial Herald*, of November 9, 1876, says of quicksilver: "The receipts of late since the beginning of the rainy season have fallen off materially, and with a good export demand from Coina and elsewhere, and improved quotations in London and Hong Kong, prices here have advanced to 55c., with even a still higher and upward tendency. The total product of the Redington Quicksilver Company, from the period of its opening up to December 31st, 1875, aggregated 58,421 flasks of 76½ lb. each, say 4,459,206½ lb. These figures are official, and go to show the great productiveness of the mine, it being one of the most profitable of all the paying mines of the State. The total product of all the New Almaden mines from July, 1850, to December, 1875, 606,453 flasks of 76½ lb. each, or 46,393,654½ lb. This result shows that the two companies named produced in the time specified 664,874 flasks, saying nothing about the New Idria and a score of other mines, details of which are not at the moment at our disposal. A valued correspondent writes us that the *Engineering and Mining Journal* of New York, of June 24th, 1876, placed the total quicksilver product in the United States during the first century of national independence at 840,000 flasks, while the San Francisco *Journal of Commerce*, of October, 1876, "special edition," gives the product at 500,000 flasks. This latter statement is thus proved to be grossly erroneous, for without the New Idria's early product, (but not now obtainable) the yield is 664,874 flasks. We are thus forced to believe that the statement prepared by Mr. R. W. RAYMOND, in the *Engineering and Mining Journal*, approximates correctness, say 840,000 flasks. We will, however, refer to this subject again. Sales of 1,000 flasks at 55c. leaves the market entirely bare of stock."

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, Nov. 17, 1876.

The uncertainity of the political situation has been the principal disturbing element in the stock market during the week just closed. The transactions show an increase of 83,374 shares the quotations however are not maintained the whole list closing lower.

Delaware, Lackawanna and Western Railroad.—This stock represents 72.240 shares in the total transactions, the extreme quotations being 73¾@70 closing at 70¾.

It has been resolved to put up some additional arching, in the new tunnel through Bergen Hill, in order to secure entire safety from falling rocks. This will take so much time that it is thought that the tunnel will not be opened for travel until after January 1st.

The strike of the employees in the Scranton shops, still continues. A few of the men, who had returned to work on the company's terms, were attacked by a number of the strikers Nov. 14, and there was almost a serious riot. The company shows no signs of giving way, and the great body of the men seem to be equally determined.

New Jersey Central Railroad.—About 36,000 shares of this stock have changed hands between 35@31⅛, closing at 34, a decline of 1 per cent. as compared with the quotation of the 10th inst. The Board of Directors of this company have made the following appointments: W. W. STEARNS, of Elizabeth, formerly superintendent of the Long Branch division, to be assistant general superintendent of the Central Railroad, its divisions and branches in New Jersey, and W. S. POLHEMUS to be assistant general superintendent of the Lehigh and Susquehanna division and branches.

Delaware and Hudson Canal Company.—This stock has been comparatively steady during the week, the extreme quotations being 71¼@68⅞, closing at 68¾, the sales aggregate 4,146 shares.

Bonds have sold to the amount of $72,000.

The Hoffman Petroleum Company will hold its annual meeting in New York, on the 20th inst.

The United Petroleum Company will hold its annual meeting in New York, on the 20th inst.

The Natural Spring Oil Company will hold its annual meeting in New York, on the 29th inst.

Cumberland and Piedmont Railroad.—It is reported, but on what grounds it is difficult to find out, that the Consolidation Coal Company is negotiating for the sale of this road to the Baltimore and Ohio Railroad Company. The road is the outlet of the Cumberland coal fields, and is their only connection with other lines of transportation. The Baltimore and Ohio, or parties in their interest, has already a considerable amount of stock in the Consolidation Coal Company.

Gore and McCunesville Railroad.—A narrow-guage railroad company has been incorporated in Ohio, the road is to run from Gore, on the Straitsville branch of the Columbus and Hocking Valley Railroad, up Monday creek, to connect with the Straitsville division of the Baltimore and Ohio Railroad at McCunesville, or Anderson station. The entire road and its equipment will not cost more than $25,000.

Quotations and Sales of Stocks and Bonds.

For the week ending NOV. 17, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	220	—
Consolidation Coal Co	—	—	32	—
Spring Mt. Coal Co	—	—	†60	—
American Coal Co	—	—	*54	—
Maryland Coal Co	—	—	10	—
Del., Lack., and West. RR. Co	73¾	70	70¾	72,240
New Jersey Central RR. Co	35	31⅞	34	35,738
Delaware and Hudson Canal Co	71¼	68¾	68¾	4,146
Quicksilver Mining Co. pref'd	17	16½	—	100
" " " Common	10½	10	—	100
Mariposa Land & Min. Co. pref'd	4	4	3½	100
St. Louis & Iron Mountain RR	12½	10	10	310
Total Shares sold				112,831
Sales for the week previous				29,457
Increase				83,374

* Nominal. † Asked,

BONDS.

	Inter'st	Sales.	Price.
Del., Lack. & West. 2d M	M. & S.	....	.... @107½
" " " 7's Con'ble	J. & D.	.	.... @105
Cent'l RR. of N.J., 1st M., New	F. & A.	6,000	.... @110½
" " " 1st Cons.	.....	13,000	84 @ 86
" " " Convert'le	M. & N.	28,000	81 @ 81⅜
Lehigh & W.-B'e, Con. Guar'd.	.....	5,000	.... @ 65
Am. Dock & Imp. Mt. Bonds	J. & J.	....	.... @ 65
Del. & Hud. Can., 1st M., 1891	.....	2,000	.... @107¾
" " " 1884	.. ....	10,000	.... @105
" " " 1877	.....	....	.... @101½
" " " Coup. 7's, 1894	.....	6,000	99½@100
" " " Reg'd 7's, 1894	.....	.....	.... @ ....
St. L. & Iron Mountain, 1st M	F. & A.	2,000	.... @100½
" " " 2d M	M. & N.	.....	.... @ 70
Chesapeake & Ohio 6's, 1st M	.....	.....	31¼@ 32
" " Ex. Coupon	.....	.....	.... @ 20
Mariposa Gold Loan con. 7s	.....	.....	.... @100⅝
Total sales	.....		$72,000

Closing quotations, in the absence of sales, represent the latest prices bid.

Philadelphia Stocks.

PHILADELPHIA, Thursday Evening, Nov. 16, 1876.

WITH but a single exception we lower the quotations of the coal shares dealt in on this market. The result of five days business, there being no session of the Board on the 10th inst., show a slight increase in the transactions, as compared with the dealings for the week previous, the total aggregating nearly 100,000 shares.

Pennsylvania Railroad Company.—This stock closes at 45½, which is nearly 2 per cent. below the final price in our last; the sales aggregate 41,000 shares.

Reading Railroad stock has ranged between 23⅜@20⅝, closing at 22⅝, which is equal to an advance of 1½ per cent.; the sales reach nearly 49,000 shares. According to the Philadelphia *Ledger* the gross receipts from railroad traffic on this road were over $1,400,000 in October, and, including the business of canals, steam colliers, and that of the Philadelphia and Reading Coal and Iron Company, the net profit of both companies for the month of October—after payment of rents on leased roads and canals, premium on gold and exchange and renewal fund—will be about $800,000. The company not only sold all the coal it mined in October, but, in addition thereto, reduced its stock of coal on hand in that month 71,000 tons, or, in other words, it sold and disposed of 71,000 tons more than it mined."

Lehigh Valley Railroad.—This stock has been very sparingly dealt in, with but a fractional variation in the quotations; the final price shows a decline equivalent to ¼ per cent.

Lehigh Coal and Navigation Company.—8,309 shares of this stock have changed hands between 28½@30⅛, closing ⅛ above the lower figure, a decline of 3⅛ per cent. from our last.

The Chesapeake and Delaware Canal Company will hold its annual meeting Dec. 4.

Auction Sales of Stocks and Bonds for the week have been as follows:

Schuylkill Iron Company.—54,000 7 per cent. bonds, interest April and October, 76½ per cent.

Ringold Iron and Coal Company.—$39,000 1st mortgage 7 per cent. bonds, interest March and September, 78½ per cent.

Pennsylvania Salt Manufacturing Company.—$1,000 7 per cent. bonds, interest January and July, 108½ per cent.

Ithaca and Athens Railroad Company.—$2,000 7 per cent. bonds, 110½ per cent.

North Pennsylvania Railroad Company.—$1,000 6 per cent. bonds, interest January and July, 107¼ per cent.

Minehill and Schuylkill Haven Railroad Company.—108 shares at $50.50 per share.

Schuylkill Navigation Company.—6 per cent. mortgage loan, interest January and July, 62 per cent.

Catawissa Railroad Company.—$5,000 7 per cent. mortgage bonds, interest February and August, 101½ per cent.

Shenango and Allegheny Railroad.—A preliminary examination has been made for a proposed extension of this road from Hilliard, Pa., to Petrolia, in the Butler oil district. The distance is eight and a half miles.

Peachbottom Railroad.—The Peachbottom Railroad, in York county, Pennsylvania, has earned during the past six months, $20,925.93, which is over sixty-two per cent., more business than it earned during the same six months in 1875.

Quotations and Sales of Stocks and Bonds.

For the week ending NOV. 16, 1876.

STOCKS.

	Highest	Lowest	Closing	Shr's
Lehigh Valley RR. Co	50½	49¾	49⅞	895
Pennsylvania RR.	46¾	45	45½	41,340
Reading RR.	23¾	20⅝	22⅝	48,991
Lehigh Coal and Nav. Co	30⅞	29⅛	29¼	8,309
Penn. Canal	—	—	*9	—
Buck Mountain Coal Co	—	—	*25	—
Fulton Coal Co	—	—	*3¼	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	*85	—
St. Nicholas Coal Co	—	—	*1	—
Cambria Iron Co	—	—	*16	—
Crane Iron Co	—	—	*25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co	—	—	65	4
Total shares sold				99,539
Sales for the week previous				96,702
Increase				2,837

* These quotations are nominal.

BONDS.

	Sales.	Price
H. and B. T. RR. 1st mortgage, 7s	$ —	— @107
" " " 2d "	—	— @102
" " " 3d "	—	— @ 38
Lehigh Valley RR. Con. mtg. 6s	4,000	100 @100¼
" " " 7s, 1910	7,000	112 @112¾
" " " 6s Reg	6,000	— @109
" " " 6s coup	—	— @108
Pennsylvania RR., 1st mtge. 6s	4,000	106¾@107¾
" " gen. " cou. 1910	—	— @107
" " gen. " 6s, reg	—	— @106
" " Cons. M. 6s reg	1,000	— @101
Phil. & Reading RR. Con. M. 7s Reg	2,000	100 @100¼
" " " G. M. 7s, coup	—	— @105
" " " Gen. M. 7s reg.	—	— @103
" " new convertible 7s	7,100	69 @ 70
" " 6s '44-80	1,000	— @103
" " Cons M. 7s coup	12,000	— @101
" " debenture 6s	—	— @ 65
Phil. & Reading C. & I. Co. Deb. 7s	—	— @ 69
" " Tamaqua tract	—	— @ 66
Lehigh Coal & Nav. Co., 6s '84	10,000	— @103
" " " RR. 6s, '97	2,200	101⅞@102
" " " con. 7s	—	— @ 90
" " " 6s gold loan	5,000	— @102
" " " Conv. gold loan	1,000	— @101
Penn. Canal, 6s	—	— @ 72
Penn. and N. Y. Canal, 7s	4,000	111 @111⅜
Ches. and Del. Canal, 6s	—	— @ 85
Susquehanna Canal, 6s	—	— @ 68
Delaware Division Canal, 6s	—	— @—
Susquehanna Coal Co. 6s	—	— @ 77
Buck. Mount Coal Co. 6s	—	— @—
Penn. Gas Coal Co. 6s	—	— @—
Honeybrook Coal Co. 7s	—	— @—
Total amount of sales	$66,300	

Closing quotations, in the absence of sales, represent the latest prices bid.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, NOV. 16, 1876.

THE market is very tame in comparison with three or four weeks ago. The sales are very small, and very little disposition to trade at all. Allouez 10 bid and no sales. The rumor that there would soon be another assessment is denied by the Treasurer. Calumet steady at 1701 bid, with few sales. 13 stockholders own 34,748 shares, the balance is held mostly in small lots for investment, and as long as it continues to pay its present dividend, there will probably be very little stock changing hands. The copper product of this company for the month of October, amounted to nearly 1,251 tons. Central is 35 bid We hear of a sale of 3 shares at that figure. Osceola firm at 19½ bid. Quincy is off two points to 46½ bid, as yet no reason is assigned for the break. Silver Stocks although sharing in the general dullness, have received most all of the attention.

Duncan Silver opened the week at 10 3-16 bid, and sold right down to 8¼, the drop attributed to a scare. At this point, however, the clique came to its support, and put some confidence in it for the moment, by buying upward of 1,500 shares. There is undoubtedly a large short interest in Duncan among the "brokers," and this is one great reason that the stock is held up so well, for no one makes so good a bull as a frightened bear. At the 2d level of this mine, very rich ore has recently been struck, wherein the native silver is quite visible to the naked eye. Some tons of this splendid ore have been taken out The Winter force is now busy at the mine, while the stamp mill is running right along. The people of Thunder Bay and whole district, are highly pleased at the good news daily received from the "Duncan." International dull sales from ⅞ to 1⅛. Dawson no sales. In small coppers nothing. Total sales in the Board for the week about 3,500 shares.

Gold and Silver Stocks.

AMERICAN MINING BOARD.

NEW YORK, FRIDAY EVENING, Nov. 17, 1876.

MINING shares are generally lower, the decline being more marked compared with the quotations of the week previous than we have noted for a long time past. Alpha Consolidated has declined $27.50 per share, Consolidated Virginia, $10 per share, California, $12.50 per share, and in this latter instance in face of a dividend of $1,080,000, which was paid to its stockholders on the 15th inst. The transactions in the stocks mentioned have been very limited, and in contrast with which we append the sales of some stocks probably not so well known to the public. The Grant Mining Company has figured in the transactions of the Board to the extent of of 7,550 shares; the Cleveland Mining Company, 6,500 shares; the Lucerne Mining Company, 7,450 shares; the Consolidated Hercules and Roe, 5,200 shares; and the Merchants' and Miners' Tunnel Company, 4,450 shares. A slight decline is noticeable in one

MINING STOCKS.

AMERICAN MINING BOARD'S LIST.

Name of Company.	Location.	Feet on Vein.	Capital Stock.	a No. of Shares.	Total Assessments Levied.	Date and Amount of Last Assessment per share.	Total Dividends paid.	Date and Amount of Last Dividend per share.	Closing Quotations g American Currency. Sat.	Mon.	Tues.	Wed.	Thurs.	Fri.	Shares sold during the Week.
Alpha Cons. G. S.	Nevada,	300	$ 3,000,000	30,000	$180,000	Aug. 12, '75, $1.	....	.....	$57 25	$42 00	$35 50	$36 00	$37 00	$35 00	600
Belcher, G. S.	Nevada,	1,040	10,400,000	104,000	660,400	April 14, '71, $1.	$15,397,200	April 10, '76, $1.	.....	16 50	17 00	14 75	14 50	14 00	500
Best and Belcher, G. S.	Nevada,	545	10,080 000	100,800	136,192	July 13, '74, 50c.	....	.....	47 75	48 50	46 50	44 75	47 25	44 50	450
Bullion, G S.	Nevada	943¼	10,000,000	100,000	2,052,000	Sept. 22, '76, $2.50.	....	.....	32 50	37 00	34 25	29 75	.....	35 50	200
Caledonia, G. S.	Nevada,	2,188	10,000,000	100,000	1,210,000	Aug. 28, '76, $1.00.	....	.....	8 87½	9 00	9 00	9 25	.....	9 25	640
California, G. S.	Nevada,	600	54,000,000	540,000	.....	.....	7,560,000	Nov. 15, '76, $2.	57 50	58 00	58 00	56 00	60 00	45 co	40
Centennial, G.	Califor.	66 acres	1,000,000	100,000b	**	.....	....	.....	....	....	....	....	....	....	....
Chollar Potosi, G. S.	Nevada,	1,400	2,800,000	28,000	1,282,000	June 26, '76, $5.	3,080,000	Feb. 10, '72, $1.	*34 00	....	*79 50	71 co	75 50	....	100
Cleveland, G.	Colo.	3,715	250,000	25,00.b	....	.....	....	.....	9 00	9 00	9 00	9 00	9 00	9 00	6,500
Cons. Hercules & Roe, S	Colo.	16,500	1,000,000	100,000	**	.....	120,000	.....	5 87½	5 87½	5 75	5 62½	5 62½	5 75	5,200
Cons. Imperial, G. S.	Nevada,	468	50,000,000	500,000	125 000	July 25, '76, 25c.	....	.....	4 12½	3 50	2 87½	3 co	3 co	2 87½	1,200
Cons. Virginia, G. S.	Nevada,	710	54,000,000	540,000	411,200	June 11, '73, $3.	24,840,000	Oct. 11, '76, $2.	52 50	49 50	49 50	47 00	49 00	42 00	40
Confidence, G. S.	Nevada,	130	2,496,000	24,960	243,840	March 18, '73, $1.	78,000	May 1, '65, $8.33½	....	15 50	....	14 00	....	14 00	400
Crown Point, G. S.	Nevada,	600	10,000,000	100,000	1,173,370	Oct. 26, '76, $1.	11,588,000	Jan. 12, '75, $2.	11 75	10 50	10 00	8 50	....	9 25	800
Eureka Cons. G. S. L.	Nevada,	..	5,000,000	50,000	100,000	May 26, '76, $1.	1,000,000	Aug. 5, '75, $1.	....	....	12 62½	12 75	....	....	200
Exchequer, G. S.	Nevada,	400	10,000,000	100,000	280,000	Sept. 23, '76, $1.	....	.....	16 50	14 00	15 00	12 25	14 50	14 00	750
Gould and Curry, G. S.	Nevada,	621	16,800,000	168,000	2,018,000	Aug. 11, '76, $1.	3,826,800	Oct. 10, '70, $10.	15 00	14 75	*13 75	14 co	....	12 75	650
Grant, G. S.	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	5 50	5 62½	5 62½	5 87½	5 75	6 50	7550
Hale & Norcross, G. S.	Nevada,	400	11 200,000	112,000	2,241,000	Oct. 10, '76, $1.	1,598,000	April 10, '71, $5.	9 25	8 50	8 37½	8 00	8 37½	7 00	1000
Hukill, S.	Colo.	3,288	1,000,000	10,000	**	.....	20,000	Nov. 1, '76, $1	....	....	....	....	....	....	.....
Indian Queen, S.	Nevada,	1,000	3 000,000	60,000	....	.....	60,000	.....	....	....	....	....	....	....	.....
Julia Cons. G. S.	Nevada,	3,000	11,000,000	110,000	110,000	Sept. 11, '76, $1.	....	.....	8 00	8 00	6 50	7 co	6 00	6 25	1,100
Justice, G. S	Nevada,	2,100	10,500,000	105,000	1,502,500	Sept. 14, '70, $5.	....	.....	26 00	25 25	*23 75	23 00	24 50	25 12½	1,000
Kentuck, G. S.	Nevada,	95	3,000,000	30,000	270,000	Dec. 3, '74, $1.	1,252,000	March 8, '70, $5.	13 00	*18 00	14 87½	10 00	10 00	....	200
Kossuth, G. S.	Nevada,	2,700	5,400,000	108,000c	405,000	Aug. 15, '76, 50c.	....	.....	....	....	....	....	....	....	.....
Leopard, G. S.	Nevada,	1,500	5,00 ,000	50,000	50,000	March 31, '76, $1.	112,500	Oct. 16, '76, 50c.	....	7 75	6 75	8 00	7 00	....	300
Luzerne Mining Co.	Colo.	4,200	5,000,000	500,000	**	.....	....	.....	1 87½	1 87½	1 75	2 12½	2 12½	1 87½	7,450
Mer. and Min. Tun. Co.	Colo.	30,000	500,000	50,000	**	..	....	.....	4 62½	4 62½	4 62½	4 75	4 50	4 62½	4,450
Mexican, G. S.	Nevada,	600	10,080,000	100,800	100,800	Sept. 5, '76, 50c.	....	.....	27 50	27 50	*26 50	....	27 co	23 87½	800
Merrimac, S.	Mass.	1,500	500,000	50,000b	**	.....	10,000	Nov. 10, '76, $1.	41 co	41 00	41 00	41 00	....	¶4 12½	1,350
Morning Star.	Nevada,	1,600	8,000,000	8',000	....	.....	....	.....	....	....	....	....	....	....	.....
Northern Belle, S.	Nevada,	1,600	5,000,000	50,000	....	.....	850,000	Oct. 16, '76, $1.	....	29 50	31 00	*37 co	26 50	25 25	100
Ophir, G. S.	Nevada,	675	10,080,000	100,800	2,031,400	May 14, '75, $2.	1,394,400	March 9, '64, $4.	53 co	50 50	47 00	46 00	45 25	*46 co	400
Original Comstock, G. S.	Nevada,	....	10,000,000	10,000	....	.....	....	.....	*2 50	*2 50	2 co	*2 50	1 25	....	300
Overman, G. S.	Nevada,	1,200	3,840,000	38,40c b	2,222,280	Oct. 21, '76, $3.	....	.....	89 50	....	*84 50	*83 00	....	....	15
Pleasant View.	Colo.	1,200	200,000	20,000	**	.....	....	.....	*1 62½	*1 62½	1 37½	*1 62½	1 62½	1 50	200
Raymond and Ely, G. S.	Nevada,	5,000	3,000,000	30,000	510,000	Nov. 5, '75, $3.	3,075,000	Sept. 10, '73, $3.	6 50	*6 75	5 00	*6 00	4 50	6 12½	300
St. Joseph Lead Co.	Missou.	2600 acs.	1,000,000	100,000	....	.....	210,000	.....	7 00	7 00	7 00	7 00	7 00	6 75	850
Santiago, G. S.	Nevada,	2,000	11,200,000	112,000	....	.....	....	.....	....	....	....	....	....	....	.....
Savage, G. S.	Nevada,	800	11,200,000	112,000	2,746,000	May 31, '76, $2.	4,460,000	June 11, '69, $3.	14 00	12 50	....	11 75	12 co	....	400
Seg. Belcher, G. S.	Nevada,	160	640,000	6,400	244,800	April 11, '76, $5.	....	.....	.....	*81 00	....	*71 00	....	....	.....
Sierra Nevada, G. S.	Nevada,	3,650	10,000,000	100,000	1,500,000	Oct. 24, '76, $1.	102,500	Jan. 16, '71, $1.	13 00	12 62½	....	12 62½	....	12 25	560
Silver City, G. S.	Nevada,	3,900	6,310,000	63,100	....	.....	....	.....	2 00	1 25	1 25	*1 00	75	*1 00	500
Silver Hill, G. S.	Nevada,	5,400	10,800,000	108,000	810,000	Sept. 18, '76, $1.	....	.....	10 00	8 00	....	8 12½	....	....	400
South Comstock, G. S.	Nevada,	1,500	10,000,000	100,000	44,000	May 3, '76, 10c.	....	.....	....	....	....	....	....	....	.....
South. California, G. S	Nevada,	1,500	5,000,000	50,000	....	.....	....	.....	....	....	....	....	....	....	.....
Southern Star, G. S.	Nevada,	1,500	6,000,000	600,000	....	.....	....	.....	....	1 00	1 50	1 75	1 25	....	1,200
Trenton, G. S.	Nevada,	..	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Union Cons. G. S.	Nevada,	850	10,000,000	100,000	260,000	March 3, '76, $1.	....	.....	....	12 00	13 00	11 75	12 75	12 37½	800
West Belcher, G. S.	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Yellow Jacket, G. S.	Nevada,	1,200	12,000,000	120,000	2,718,000	Oct. 28, '76, $1.	2,184,000	Aug. 10, '71, $2.50.	....	19 co	17 12½	16 00	15 50	15 50	600
Young America, S.	Nevada,	1,000	3,000,000	30,000	6,000	Oct. 23, '76, 20c.	....	.....	....	....	....	....	....	....	.....

Assessments levied to date, $27,647,782 Div'ds pd. to date, $82,603,400 — Total sales..... 50,085

BOSTON STOCK MARKET.

									Fri.	Sat.	Mon.	Tues.	Wed.	Thurs.	
Allouez, c.	Mich.	..	$1,000,000	20 000	$940,000	May 9, '76. $5.	....	.....	$10 00	10 co	10 co	10 co	10 co	10 00	.....
Calumet and Hecla, c.	Mich.	2¾ mile	2,000,000	80,000 i	1,200,000	.....	$11,050,000	Oct. 21, '76, $5.	170 00	170 00	171 25	171 00	170 50	170 00	.....
Central, c.	Mich.	..	500,000	20,00c	100,000	June, '62. 65c.	1,020,000	Feb. 17, '76, $5.	35 00	35 00	35 00	35 00	35 00	35 co	.....
Copper Falls, c.	Mich.	..	1,000,000	20,000d	535,000	May 10, '76,	100,000	Nov., '71, $1.	4 co	4 00	3 87½	3 87½	3 87½	3 87½	.....
Dana, c	Mich.	..	500,000	20,000d	68,000	Jan., '73, 50c.	....	.....	12½	12½	12½	12½	12½	12½	.....
Dawson, S.	Canada.	..	1,200,000	60,000f	....	.....	.. ..	.....	17½	17	17	17	17	15	.....
Duncan, S.	Canada.	..	1,200,000	60,000f	75,000	July, '76, 41¾.	....	.....	10 18¾	9 75	8 25	8 87½	8 87½	9 00	.....
Franklin, c	Mich.	..	500,000	20,000d	360,000	June, '68, $5.	585,000	Nov., '71, $1.	13 25	13 37½	13 00	13 25	13 62½	14 25	.....
†Humboldt, c.	Mich.	..	500,000	20,000d	100,000	Sept. 28, '76, 15c.	....	.....	2	2	2	2	2	3	.....
International, S.	Canada.	..	1,200,000	60,000f	....	.....	....	.....	1 00	1 00	87½	94	1 00	1 12½	.....
Madison, c.	Mich.	..	500,000	20,000d	123,000	Sept. 11, '74, 10c.	....	.....	27	27	27	27	27	27	.....
Mesnard, c.	Mich.	..	500,000	20,000d	160,000	April 12, '65, 50c.	....	.....	30	30	30	30	30	30	.....
Minnesota, c.	Mich.	..	1,000,000	20,000e	436,000	June 10, '69, $1.	1,820,000	Mch. 15, '76, 50c.	1 00	1 co	1 00	1 00	1 00	1 12½	.....
National, c.	Mich.	..	500,000	20,000e	195,000	Oct., '75, $1.	360,000	Oct., '73, $1.	2 12½	2 12½	2 12½	2 12½	2 12½	2 12½	.....
Osceola, c	Mich.	..	1,000,000	40,000d	880,000	May 1, '76, $2.	....	.....	19 00	19 co	19 25	19 25	19 50	19 50	.....
Petherick, c.	Mich.	..	500,000	20,000d	165,533	March 22, '76, 50c.	....	.....	55	50	55	50	50	50	.....
Pewabic, c.	Mich.	..	500,000	20,000d	185,000	June, '68, $3.	460,000	July, '73, $1.	4 00	4 00	4 00	4 co	3 75	3 75	.....
Phenix, c.	Mich.	..	1,000,000	20,000d	817,500	Sept., '70, $3.	....	.....	....	....	....	....	....	....	.....
Quincy, c.	Mich.	..	h 200,000	20,000b	....	.....	2,050,000	Oct. 28, '76, $3.	48 00	48 00	47 50	47 50	47 00	46 50	.....
Ridge, c.	Mich.	..	500,000	20,000d	....	... ..	....	.....	5 75	5 75	5 75	5 75	5 75	5 75	.....
Rockland, c.	Mich.	..	500,000	20,000d	495,000	Jan., '74, $1.	....	.....	28	28	28	28	28	28	.....
Star, c.	Mich.	..	500,000	20,000f	265,000	March 30, '76, 50c.	....	.....	35	35	35	35	35	35	.....
Superior, c.	Mich.	..	500,000	20,000f	340,000	March, '74, 25c.	....	.....	12½	12½	12½	12½	12½	12½	.....

Assessments levied to date, $7,440,033 Div'ds paid to date, $17,445,000 — Total sales .. ..3,500 shares.

G. Gold. S. Silver. L. Lead. C. Copper. *a* The par value of shares is $100, unless otherwise designated. *b* Par value $10. *c* Par value $50. *d* Par value $25 each. *e* Par value $15. *f* Par value $20. *g* Closing quotations represent the latest prices bid. Prices asked will have a * affixed. *h* Full paid. *i* On the four old companies. ** Not Assessable. †Ass. unp. aid. ¶ This Company has increased the number of shares to 50,000 in place of 5,000 as formerly.

or two of them, but in some of these cases the quotations have no apparent connection with the value of the mines, and as the number of shares quoted as sold, bears no definite proportion to the actual *bona fide* transactions. Any remarks upon them are unnecessary. We notice little or no moral improvement in certain of the transactions in the Board. The sales in the shares of the five companies given above, aggregate 31,150 shares out of a total of 50,085 shares, which comprises the total transactions of the Board for the week.

Bank of California.—The assessment of $10 per share, levied by this institution on the 27th ult., was the eighth of the series provided for by the syndicate, and brings the aggregate amount of assessments up to $4,000,000, which is equal to $80 per share. By the 1st of January, 1877, the actual paid-up capital will again be $5,000,000 in gold coin and also a fair surplus. The bank has retained a large number of its old depositors, and is now on a better basis than it was for some time before the suspension. The line of deposits now exceed $6,000,000, and there is probably $2,000,000 in coin constantly on hand. The stock of this Bank is quoted at from 89 to 90 per cent. in San Francisco.

The Manhattan Silver Mining Company has declared a dividend of $1 per share.

Cedarburg, N. E., Gold Mining Company.—This company has declared a dividend of 50 cents per share. We note sales of this stock on the Board during the week aggregating nearly 5,000 shares, at from $6½ to $8 per share.

California.—Daily yield, 400 tons of ore, keeping the mills steadily running. The bullion yield of the mine for the month of October will not fall much, if any, short of $1,250,000, although last evening the bars of bullion had not yet all been stamped so as to show the precise result. A surplus was carried over from last month, so that all expenses are paid and the company can without trouble pay the usual dividend of $1,080,000, and still have a surplus to add to the November account. The ore breasts are yielding rich ore at all points. The south drift, on the 1,600-feet level, is in a distance of 170 feet, the face still in fair ore, although not of so rich a character as that recently penetrated by the same drift. The west drift from the 1,650-feet station of the C. and C. shaft is now in a distance of 200 feet, the face in good running ground and the drift steadily advancing at the rate of ten feet per day. This drift will have about 600 feet to run to reach the main ledge. A pump tank and station is being put in the C. and C. shaft below the 1,650-feet level, pending the completion of which the sinking of the shaft is suspended. The new side-track and ore dump for shipping ore to the Carson River mills is finished.

Consolidated Virginia.—The extraction of ore was slightly interrupted during the first part of the week by the water which we reported struck last week on the 1,400-feet level. That has been drained, however, and the usual amount of ore is being again extracted. There has been no change in any of the ore breasts or prospecting drifts during the week. The flow of water did not injure the mine and proved to be only a small pocket lying on the east side of a heavy clay slip, which, giving way suddenly, let the water in with a rush. The bullion yield for the month of October will not vary much from $1,350,000, which will pay all running expenses, and leave a small surplus after paying the usual dividend, of $2 per share, which was declared on the 3d instant. Owing to the flooding of the main drift, on the 1700-feet level of the GOULD & CURRY and BEST & BELCHER, driving the north drift on the 1,700-feet level has been suspended for a day or two past. Everything will be in good repair and it will be again advancing as usual in a day or so more.

Julia.—The south drift on the 1,800-feet level is still showing a decided improvement. The quartz is more concentrated and of a livelier, better character. The south drift on the 1,600-feet level is making splendid progress. This drift is running to connect with the Ward shaft, and must in its course strip quite a large portion of the ledge ready for crosscutting whenever the management desire to do so. The east drift on the 1,800-feet level is still advancing without change of interest.

Imperial Consolidated.—The south drift from the bottom of the south winze on the 2135-feet level is being pushed rapidly ahead, the face in soft ledge material. The face of the north drift from the bottom of the same winze is also in quartz and favorable ledge formation. The south drift from the bottom of the north winze on the same level is in good working ground, and is making rapid progress.

Sierra Nevada.—The flow of water at the bottom of the shaft is still quite strong, but is easily handled by the pumps and affords no impediment to the working of the 1,700-feet level. The north and south drifts on the 1,700-feet level are being pushed rapidly ahead, the face of each being in good working ground. The prospecting drifts both north and south on the third station level are showing a decided and very encouraging improvement. The drifting and crosscutting on the first and second station levels is being advanced at all points, with no change to note.

Ophir.—Owing to a stoppage of the Mexican mill for

repairs and to give time for the opening of some new portions of the ore body caved by the flooding of the mine a year ago, the daily yield of ore has been greatly lessened during the past week. The ore stopes on the 1,600 and 1,650-feet levels continue to yield well and furnish a good quantity of ore. The prospecting drifts in every portion of the mine are steadily advancing, with but little if any important changes to note for the week. Sinking the main incline is making good progress.

Chollar-Potosi.—Daily yield 100 tons of ore from the old stopes in upper portions of the mine. The average assay value of the ore is about $30 per ton. Sinking the Combination shaft is making the usual steady progress. Sinking the main incline is going forward at the rate of 2¼ feet per day.

Mexican.—The west drift on the 1,465-feet level, following the line of the diamond drill hole, is steadily advancing, this drift recently struck quartz with some ore and looks as if a paying body of ore might be encountered at any time. The west drift on the 1,300 feet level is making rapid progress.

Savage.—The pumps have been kept steadily running at their full capacities during the week, and are steadily though slowly gaining on the flow of water. The water during the first portion of the week showed a strong increase in the main shaft, but is now rapidly on the decrease.

Justice.—The mine continues to show richly on all the ore producing levels. Daily yield 225 tons of ore The ore body on the 800-feet level continues to improve both going north and in the winze now being sunk to connect with the upraise from the 700-feet level. This upraise is also in ore of a very fine character. The main south drift is steadily advancing, the face still in good ore. The east crosscut from the north-east drift on the 1,000-feet level is rapidly advancing, the face in quartz and porphyry of a very favorable description. The main south drift on the same level is being rapidly driven ahead toward the ledge.

Yellow Jacket.—The east cross-cut, 100 feet south of crosscut No. 1 on the 2,040-feet level, is in 205 feet, face in porphyry and quartz of good quality. Work in the south winze below the 1,940-feet level, and also in the north drift running toward the Imperial is progressing favorably. The new or east shaft is down 47 feet and well timbered to that depth.

Crown Point.—There are no new features to report of the prospecting operations on the 1,700-feet level. Sinking the main incline shaft is going rapidly ahead. It is now rapidly nearing the 1,900-feet level.

Hale & Norcross.—The pumps are working finely and are kept running up to their fullest capacities. The water has been lowered in the main incline during the past week at the rate of five feet per day.

Belcher.—Sinking the main incline is going ahead rapidly. Sinking the air and drain shaft is also making good progress. The water gives no trouble. Daily yield, 250 tons of ore. The ore is taken from the old upper workings, and is just enough to keep the mills steadily running. The prospecting drifts on both the 1,500 and 1,600-feet levels going south afford no developments of interest to record.

Sutro Tunnel.—Total length 14,943 feet. Face of header in very fair working material, principally porphyry, with streaks of quartz and clay.—*Gold Hill News*, Nov. 9th.

Meadow Valley.—A recent official letter says: "The repairs in Summit shaft have been somewhat retarded during the week. Owing to our supply of timber having become exhausted, we were necessarily compelled to suspend operations until a supply can be obtained sufficient to enable us to prosecute the work to completion without further delay. Since the stoppage of the Raymond and Ely pump the water has been raising in the winze below the 1,200-feet level until it now shows a depth of 20 feet. The prospect work being prosecuted in the old abandoned levels of the mine by individual prospectors, is still furnishing a little average milling ore, the principal portion of which is being selected from the rejected matter in the old stopes.

Gas Stocks.

NEW YORK, FRIDAY EVENING, Nov. 17, 1876.

GAS stocks continue dull with a drooping tendency.

The Metropolitan Gas Company, of Brooklyn, has declared a semi-annual dividend of 2½ per cent., payable on the 20th inst.

The Massachusetts Gas Commission.—This commission was appointed early in 1875; from its report, which has just been made public, we learn that six out of seven companies supplying Boston, have a capital of $4,613,000, and made in the past year 940,338,000 cubic feet of gas of an average illuminating power of over 17 candles. The commission recommends that a permanent Board of Commissioners shall be appointed, which shall have authority to thoroughly inspect all of the companies of the State, and also through a competent auditor examine the accounts of the companies, (which accounts shall be published annually), also that the commissioners shall have the power to fix the price of gas at such rates as would not allow the earning of a dividend in excess of 10 per cent. on the capital, and any excess of profit above this to go toward the diminution of the price of gas the following year.

St. Louis Gas Companies.—The St. Louis Gas Light Company made and distributed for the year 1875, 280,000,000 cubit feet, against for 1874, 259,000,000 cubic feet; the Laclede Gas Light Company made and distributed for the year 1875, 180,000,000 cubic feet; Carondelet Gas Company, 40,000,000; total, 500,000,000 cubic feet. Consumption of gas for the past 4 years was as follows, the average price being $3.25 per thousand feet: 1875, 500,000,000 feet; 1874, 420,000,000 feet; 1873, 400,000 000 feet; 1872, 380,000,000 feet; total, 1,720,000,000 feet. Heretofore coal for gas-making has not been used from other than the Pennsylvania coal fields. Quite recently, the Bryden, Illinois, coal has been shown to be admirably suited to making a rich gas and also a good coke. The future price of gas to the people of St. Louis will, therefore, be considerably lowered from the present reduced price, $2.50 per thousand feet.—*Mines, Metals, and Arts.*

Auction Sales of Stocks and Bonds for the week have been as follows:

Brooklyn Gas Company.—40 shares at $184 per share.

Metropolitan (N. Y.) Gas Company.—$1,200 scrip stock at 102 per cent.

Northern Liberties (Philadelphia) Gas Company.—3 shares at $46.50 per share.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Companies in New York and Vicinity	Cap. Stk.	Par.	last Dividend	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.	$5,000,000	$ 100	2½	Oct. '76	106½	107
" " Bonds	90,000	1,000	3½	Feb. '76	106	109
NewYork, "	4,000,000		5	Nov. '76	135	138
Metropol. "	2,500,000	100	5	Sep. '76	140	145
" " Certf.	1,000,000		3½	" "	102½	104½
" " Bonds	500,000	1,000	3½	Jan. "	102	102½
Harlem "	1.850,000	50	4	Aug. '76	103	106
Manhattan "	4,000,000	50	10	July "	238	239
Brooklyn, B'klyn	2,000,000	25	5	Nov. '76	179	181
Nassau "	1,000,000	25	4	Jan. '76	75	—
" " Certf.	700,000	1,000	3½	Nov. '76	95	—
People's "	1,000,000	10	3½	Jan. '76	50	55
" " Certf.	300,000	1,000	3½	July '76	88	90
" " Bds	325,000		3½	Aug. "		95
Metropol. "	1,000,000	10	3½	Nov. '76	*76	80
Wmsburgh "	1,000,000	50	3	Oct. '76	130	—
" " Certf.	1,000,000		3½	July "	101	102½
Citizen's "	1,200,000	20	2½	Jan. '76	97	100
" " Certf.	320,000	1,000	3½	Oct. "	98	100
J. C. N.J.	750,000	20	5	July,'75	100	—
Cantl. Westch. N.Y.	466,000	50	4	July. "	90	—
Subur'n " "	390.000	50				90

* Ex Dividend 2½ per cent. ‡ † Gold.

COMPANIES OUT OF TOWN.

We refer to our issue of the 4th inst. for the list of these.

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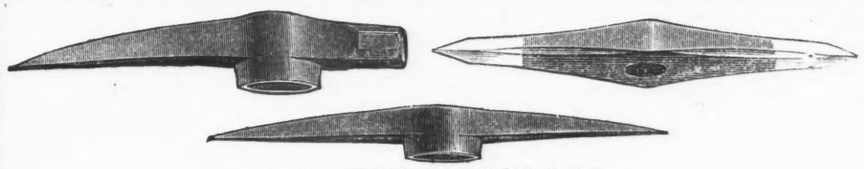

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